THURBER ENGINEERING LTD.
GEOTECHNICAL ▪ ENVIRONMENTAL ▪ MATERIALS

PRELIMINARY ENVIRONMENTAL ASSESSMENT
1355 FISHER ROAD GROUNDWATER WELL SITE
COBBLE HILL, B.C.

Report

to

COWICHAN VALLEY REGIONAL DISTRICT

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1.0 INTRODUCTION

This report is a preliminary environmental assessment of properties located in the vicinity of an existing groundwater well (Ministry of Environment Well Tag #102275, hereby called the well) located at 1355 Fisher Road in Cobble Hill, B.C (see Drawings 17-971-13-100 and 17-971-13-101 in Appendix A). The approximate site coordinates for the well are Latitude 48° 41' 34", Longitude 123° 35' 49" as determined from the Cowichan Valley Regional District Internet Mapping Framework.

This report was commissioned by the Cowichan Valley Regional District (CVRD) via email on May 31, 2011 and as such, the assessment methodology and recommendations in this report are directed to address the primary goals of the CVRD in relation to this project. Please be advised that the goals and objectives of the CVRD may differ from those of the owners of each of the properties discussed as part of this report.

The project participants are Thurber Engineering Ltd. (Thurber) who produced the report, Fisher Road Recycling (Mr. Dave Laing and his consultant Mr. Hubert Timmenga, Ph.D., P.Ag.) who consented to a site visit tour, interviews and provided background information to Thurber and the CVRD who commissioned the report. Mr. Edward Gamboa (owner of an adjacent property at 1360 Fisher Road and 1375 Fairfield Road) and Mr. Peter Butler (of 1345 Fisher Road) also provided information during interviews and or a site tour relevant to achieving the report objectives. The above property owner participants were also asked by the CVRD to review a draft of this report and to provide comments and or suggested edits for consideration by Thurber. All comments received by the stated deadline were considered and a number of the suggested edits were incorporated into this final report.

This report is not a formal Stage 1 Preliminary Site Investigation (PSI) as defined by the B.C. Environmental Management Act, nor is it a Phase 1 Environmental Site Assessment (ESA) as defined by CSA Z768-01. While this report is generally consistent with many of the aspects of a Stage 1 PSI and Phase 1 ESA, some of the specific formatting and reporting requirements of reports of these types have not been met and as such, this report is generally not suitable for submission to the Ministry of Environment. This report is also not a detailed groundwater investigation, or intended to definitively determine liability.

Use of this report is subject to the Statement of General Conditions which is included at the end of the text of this report. The reader's attention is specifically drawn to these conditions as it is essential that they be followed for proper use and interpretation of this report.

2.0 BACKGROUND

Groundwater sampling conducted at the well since 2002 has found relatively consistent levels of nitrates (in the range of ~39 to ~72 mg/L) which exceed the Contaminated Sites Regulation (CSR) Schedule 6 Drinking Water standard and identical Canadian Drinking Water Quality Guideline of 10 mg/L. These results are a concern as the local groundwater aquifer is used as a source of drinking water by nearby residents. A drilling log for the well, and a Ministry of Environment Detailed Well record for the well are included at the front of Appendix C. A brief summary of the observed water quality at the well site (and other nearby well sites) is presented in Section 4.9 of this report, and summarized in detail within a November 23, 2010 report entitled "Environmental Review – 1355 and 1345 Fisher Road, Cobble Hill, British Columbia" produced by EBA Engineering Consultants Ltd. for the CVRD. We understand that the EBA report is publicly available and as such, has not been appended to this report.

As the well is located at 1355 Fisher Road, that property is the primary focus of this report however, other nearby and up gradient properties (predominantly to the east and south) are also discussed as part of this assessment as they also have the potential to impact the groundwater conditions at (and potentially beyond) the 1355 Fisher Road well site. Significantly less attention has been directed to properties located down gradient (to the north or northwest) of the well site. The property at 1355 Fisher Road is currently owned and occupied by Fisher Road Recycling which operates an organic materials composting facility on the property (Drawing 17-971-13-103).

The primary purpose of this work is to assess the "potential" for environmental soil and groundwater contamination at properties near the well site for the purpose of designing a proposed groundwater investigation program to be conducted by the CVRD. In this context, the word "potential" is defined as: "possible, as opposed to actual" or similarly, "capable of being or becoming". The proposed groundwater investigation to be conducted following this report is intended to provide more direct evidence regarding the extent of the apparent groundwater contamination at 1355 Fisher Road, as well as a better indication of the source or sources of the contamination.

As stated above, current and historical site activities are identified for 1355 Fisher Road and other adjacent properties that have the potential to impact the local groundwater quality. While this report primarily focuses on the property at 1355 Fisher Road (as it is the property upon which the well is located), this environmental assessment includes a significant amount of information that relates to a number of

adjacent properties. However, a full assessment of all adjacent properties is beyond the scope of this project.

The objectives of this report are to:

1) Identify potential sources for the apparent groundwater contamination observed in the well at 1355 Fisher Road through a review of the current and historical land uses at 1355 Fisher Road and adjacent properties. This is achieved through a review of readily-available information, site visits and interviews with persons familiar with each of the key sites.

2) Determine if other potential contaminants (i.e. other than nitrates) could pose a potential risk to the local groundwater quality based on a review of current and past site uses in the area, and as such, should be analyzed for as part of a future proposed groundwater investigation.

3) Provide recommendations to the CVRD regarding the potential placement of future groundwater monitoring wells and a list of recommended parameters for future analysis.

The program of work for this report comprised the following:

- A review of historical aerial photographs to determine historic activities at 1355 Fisher Road and adjacent properties.
- Review of historical maps and previous environmental reports.
- A search of the BC Government Site Registry.
- A land title search of 1355 Fisher Road.
- A municipal records search.
- Limited site visits to the properties of concern.
- Interviews with persons who are knowledgeable about the site and adjacent sites.
- Preparation of this report.

No environmental samples were collected or analyzed by Thurber for this study and the study did not address any issues related to the generation of odours from 1355 Fisher Road, or other nearby sites.

2.1 Applicable Regulatory Standards

Investigation and management of contaminated sites in British Columbia is governed by the BC Environmental Management Act (EMA) and the BC Contaminated Sites

Regulation (CSR). The CSR establishes soil, groundwater and vapour remediation standards for regulated substances based on specific land uses (e.g. agricultural, urban park, residential, commercial or industrial) and groundwater uses (irrigation, livestock watering, drinking water and aquatic life). Soil, groundwater and vapour that meet, or are lower than the applicable CSR standards are considered acceptable (not contaminated). If substance concentrations in soil, soil vapour or groundwater exceed the applicable CSR standards, remediation or risk assessment may be required if there is potential for damage to human health or the environment, or site redevelopment is proposed.

The site at 1355 Fisher Road is a full time commercial/industrial organic composting facility operating under the Organic Matter Recycling Regulation, and as such it is our understanding that the CSR Schedule 4 Generic Numerical Soil Standards for Industrial Land Use (IL) are currently applicable. The lowest of CSR Schedule 5 Matrix Numerical (IL) Soil Standards for "intake of contaminated soil", "toxicity to soil invertebrates and plants" and "groundwater used for drinking water" are also applicable as a number of groundwater wells are located within 500 m of the property. However, the standards for "groundwater flow to water used by aquatic life" are not applicable as there are no known aquatic life-bearing water bodies within 500 m of the subject property. CSR Schedule 6 Generic Numerical Standards for Drinking Water are applicable to groundwater. The Schedule 11 Generic Numerical Vapour Standards for IL use are also applicable. Other CSR standards may be applicable at adjacent sites with other (non-Commercial or Industrial) land uses.

3.0 SITE DESCRIPTION

The general location of the study area is shown in Drawing 17-971-13-100 included in Appendix A. Drawing 17-971-13-101 illustrates the general area layout, legal lot boundaries, addresses and the level of site development in the area as it existed in 2005. Drawing 17-971-13-102 shows the level of site development in the area as it existed in 1975. Drawing 17-971-13-103 is a sketch of the current (and proposed) level of site development at 1355 Fisher Road while the areas of potential environmental concern (APEC) and potential contaminants of concern (PCOC) for the property at 1355 Fisher Road are summarized on Drawing 17-971-13-104. APEC and PCOC for other adjacent properties are presented and discussed in the report text in Sections 4, 5 and 6 below.

Summary information for the well site property at 1355 Fisher Road is included in Table 1 below.

Table 1: Summary Information 1355 Fisher Road

Civic Address	1355 Fisher Road, RR 2, Cobble Hill B.C. V0R 1L2
Legal Description	Lot 1, Section 13, Range 6, Shawnigan District Plan 29581 Except Plan VIP51903
Parcel Identifier	001-377-892
Municipality	Cowichan Valley Regional District
Zoning	I - 1C (Light Industrial Limited)
Latitude and Longitude	Latitude 48° 41' 33.5" N, Longitude 123° 35' 47.4" W
Owner	Fisher Road Holdings Ltd.
Occupied by	Fisher Road Recycling which operates a commercial compost facility and recycling transfer station on the site
Size of Property	3.1 Ha.
Site Elevation	Approximately 120 m elevation
Site Buildings	An assortment of industrial use buildings and asphalt and concrete pads are located on the property as shown in Drawing 17-971-13-103
Water and Sewer	We understand that the site groundwater well is used for industrial processes and bottled water is used for consumption purposes. We understand that the property is not connected to a municipal sewer system.

3.1 Topography

The topography in the vicinity of 1355 Fisher Road is dominated by a local northwest-southeast oriented ridged hill, with lower-elevation terrain to the northeast, south and southwest of the well site. The property at 1355 Fisher Road is generally undulating with an overall (gentle) downward slope gradient from the centre of the property towards the northeast. The highest portion of the property is located near the northwestern lot corner. Adjacent properties to the south are at a lower elevation.

3.2 Surrounding Property Current Land Uses

1355 Fisher Road is located within an area of general mixed land use. A Cowichan Valley Regional District zoning map is included at the back of Appendix A. Local addresses are included on Drawing 17-971-13-101. Both addressed and

unaddressed properties border 1355 Fisher Road. A summary table of the adjacent site uses is included below. The current land uses were determined as observed by field observation (conducted June 27, 2011) and our review of the CVRD zoning map.

Table 2: Surrounding Property Uses

Address	Current Site Use
1344 Fisher Road	Harlequin Clothing Factory Outlet
1345 Fisher Road	Central Landscape Supplies Ltd. – yard and garden waste recycling facility, production of Class A compost
1357 Ball Road	Raven Metal Products manufacturing
1354 Ball Road	Island Commissioner Industrial Services
1356 Ball Road	Residential with a large shop
1360 Fisher Road	Gamboa Greenhouses
1375 Fisher Road	Residential
1395 Fisher Road	Residential
Unaddressed Lot 6 to West of Subject Property	Vacant treed property
Unaddressed Lot 1, North of Subject Property	Gravel pit and Pacific Building Systems

The available mapping suggests that there are no aquatic-life bearing surface water bodies located within 1000 m of the site. However, a ~14 m square, lined pond is visible on the 2005 orthophoto (Drawing 17-971-13-101) located 100 m north of 1355 Fisher Road. The pond is associated with a gravel extraction operation located to the west of the western end of the lot at 1309 Fisher Road and as such, is unlikely to contain significant aquatic life and is not connected to the local groundwater table.

3.3 Geology

The surficial geology in the area has been mapped by the B.C. Geological Survey Branch as consisting of hummocky morainal blanket (Till) and silty glaciolacusterine deposits overlying sand and gravel glaciofluvial fan deposits. Exposures of sand and

gravel are present to the north and east of Fisher Road within borrow areas visible on air photos. The site groundwater well installation record (see Appendix C) suggest that the site soils at the drill site consist of sand and gravel soils from the surface to a minimum of 218 ft (66 m) depth. However, this may be in contrast to observations made during the site visit where a ~2 to ~3 m deep fresh excavation area located a short distance to the south of the well pump house on the subject property was found to have exposed the upper 2 to 3 m thickness of the soil. The excavation walls and floor exposed a heterogeneous silty glacial till, which presumably overlies the lower granular deposits. The till exposed in the excavation ranges from a massive, silty, matrix-supported diamicton (with no apparent internal structure), to weakly and irregularly bedded diamicton with a more sandy matrix and intermittent irregular-shaped meter-scale sorted sand-filled lenses. While the full extent and depth of the till is unknown on the property, it is suspected (but not confirmed) that the till underlies most portions of the subject property to a depth of at least 2 to 3 m.

The apparent heterogeneous (i.e. presence of the observed inter-till sand lenses) and possibly intermittent nature of the till suggests that surface water infiltration through the till layer may be faster (in certain areas of the site via natural or man-made preferential pathways) than would otherwise be suggested by the presence of a more homogeneous silty till layer. However, further assessment is required to determine the till's permeability characteristics.

The bedrock geology in the vicinity of the site is unmapped on the 1:100,000 scale Geological Survey of Canada Map "Geology Victoria – West of the 6th Meridian" by J.E. Muller (1980), as the area is shown to be underlain by a thick sequence of glacial soils. However, nearby outcrops predominantly consist of late Cretaceous sedimentary rocks of the Nanaimo Group Comox Formation, which includes sandstone, conglomerate, siltstone and shale.

3.4 Groundwater

The 2010 EBA report conducted for the properties at 1345 and 1355 Fisher Road included a search of nearby groundwater monitoring wells which found 29 registered water wells located within a 500 m radius of the entrance to the site. Additional findings from the EBA report concerning the local groundwater quality are presented in Section 4.9.

A Groundwater Flow Assessment report produced by Thurber Engineering Ltd. dated May 16, 2011 found a groundwater flow gradient in the area of Fisher Road of approximately 0.004 to 0.005 (i.e. 4 or 5 m vertical drop over 1000 m horizontal distance) towards the north-northwest. The groundwater flow direction measured in the vicinity of Fisher Road is shown on Drawing 17-971-13-101. A later draft memo

provided to the CVRD by Thurber Engineering Ltd. (dated August 9th, 2011) calculated an approximate horizontal groundwater flow velocity of 0.15 m per day. The assessment was conducted by installing data logging transducers into 6 nearby surveyed groundwater wells (unused) over a 9 day period and interpreting the results. At 1355 Fisher Road, the groundwater surface is located approximately 57 m below the ground surface near the centre of the site. As such, the local groundwater flow direction is likely unaffected by the presence of the local topographic high.

A brief summary of some of the regional well construction details are included in a table in Appendix C. As is evident from the table, the wells are all screened at different depths below the groundwater table (using different screen lengths) and as such, water quality data obtained from the different wells should not be directly compared with each other and may not be directly comparable to CSR standards.

4.0 SITE HISTORY

The history of the property at 1355 Fisher Road and adjacent properties was compiled through the viewing of BC Government air photos, a historical land title search (for 1355 Fisher Road only), municipal records searches, review of a previous environmental reports and discussions with persons who are familiar with the sites. A listing of references is included at the end of the text of this report.

4.1 Land Titles

A portion of the land title history for 1355 Fisher Road is summarized in Table 3 below. The full land title history was not obtained due to cost and the low likelihood of revealing significant information not able to be obtained by other means. Copies of earlier land titles are included in Appendix B, along with a copy of the current legal plans for 1355 Fisher Road (Lot 1) and 1345 Fisher Road (Lot A, subdivided portion).

Table 3: Historical Land Titles 1355 Fisher Road

Owner	Parcel	Date
Fisher Road Holdings Ltd.	Lot 1, Section 13, Range 6, Shawnigan Dist. Plan 29581 Except Plan VIP51903	March 14, 2006
Westcoast Landfill Diversion Corporation	Lot 1, Section 13, Range 6, Shawnigan Dist. Plan 29581 Except Plan VIP51903	June 8, 2000
Grace Ethel Bishop	Lot 1, Section 13, Range 6, Shawnigan Dist. Plan 29581	June 10, 1976
Grace Ethel Bishop	Lots 7 and 8, Section 13, Range 6 Shawnigan Dist. Plan 1038	January 16, 1976

Owner	Parcel	Date
Grace Ethel Thompson (1/2)	Lots 7 and 8, Section 13, Range 6 Shawnigan Dist. Plan 1038	August 29, 1972
Grace Ethel Thompson (1/4)	Lots 7 and 8, Section 13, Range 6 Shawnigan Dist. Plan 1038	May 27, 1971
Gary and Grace Thompson (1/2) Keith Thompson (1/2)	Lots 7 and 8, Section 13, Range 6 Shawnigan Dist. Plan 1038	November 15, 1966
Official Administrator County of Nanaimo	Lots 7 and 8, Section 13, Range 6 Shawnigan Dist. Plan 1038	January 12, 1966
John Umland	Lots 7 and 8, Section 13, Range 6 Shawnigan Dist. Plan 1038	September 24, 1958
Agnes Bell and Eva Dann	Lots 7 and 8, Section 13, Range 6 Shawnigan Dist. Plan 1038	May 13, 1957

The land titles reveal little of environmental interest. It appears that the 1.416 ha parcel at 1345 Fisher Road (Lot A, Plan VIP51903) was subdivided from the larger former Lot 7 parcel (now Lot 1, Plan 29581) during January of 1991.

4.2 Fire Insurance Maps

There are no known fire insurance maps available for the Fisher Road area.

4.3 City Directories

There are no known city directories available which include Cobble Hill.

4.4 Air Photograph Interpretation Summary

The following air photographs were examined.

- BC243 Frames #46 and 47, 1946
- BC1053 Frames #58 and 59, 1950
- BC2087 Frames #9 and 10, 1957
- BC5057 Frame #54, 1962
- BC7760 Frames #245 and 246, 1975
- BC84027 Frames #267 and 268, 1984
- BCB93095 Frame #277, 1993
- BCC98036 Frames #73 and 74, 1998
- CRD Air Photo Line 009, RC-13 001, 2005

The development history for the area was determined based on our interpretation of the above referenced air photos and presented for each property below. Air photos

taken in 1975 and 2005 are provided for reference on Drawings 17-971-13-102 and 17-971-13-101 in Appendix A.

1355 Fisher Road

The site appears to have been occupied by a rural residential house since before the earliest available air photo was taken (1946). The site was predominantly treed at that time, with a small house and clearing centrally located on the property. However, by 1962, the property was occupied by a small farm which included a house, a number of outbuildings (e.g. barns, chicken coup and work shed etc?) and a small vegetable garden. By 1975, the site was predominantly cleared of trees and the northwest corner of the property was occupied by a roughly circular area of exposed soil that may have been some type of road or motorcycle track(?). The farm was essentially unchanged until 1993 when a new, large outbuilding was visible near Fisher Road. However, that building was not visible in the 1998 air photo. By 2005, few of the previous farm buildings were visible. Several new buildings had been constructed on the site within the eastern portion of the property (e.g. in-vessel composting curing bins) and several large piles of soil are visible within the northern, southern and western portions of the property. The property changed significantly after 2006 when the current Fisher Road Recycling business began operations (see Drawing 17-971-13-103 and description of current site operations in Section 5).

1345 Fisher Road

This property was treed and vacant until it was cleared some time during the late 1960's or early 1970's. In 1975 a small ATCO trailer or mobile home is visible within the central portion of the property. The trailer or mobile home was not visible in the 1984 airphoto, but it appears that a small amount of fill had been placed within the central portion of the parcel. By 1993, the property at 1345 Fisher Road had been completely transformed by the presence of a number of large soil stockpiles taking up most of the central and western half of the property and a new large commercial-type building was present within the eastern portion of the property. This property was essentially unchanged in the 2005 airphoto, however as the 1998 and 2005 photos are colour, it is possible to determine that one of the large piles on the property may be wood chips or sawdust. We understand that this property use changed in 2006 and is now occupied by Central Landscape Supplies Ltd. which produces Class A compost on the site from yard and garden waste.

1340 and 1344 Fisher Road and 1357 and 1355 Ball Road

These series of properties located on the east side of Fisher Road were essentially undeveloped until some time between 1975 and 1984 when a large

commercial/industrial type building was constructed at 1357 Ball Road and gravel extraction was occurring at 1344 Fisher Road. By 1998, a commercial building had been constructed at 1340 Fisher Road, a series of new loading bays (or work stations) had been added to the existing building at 1357 Fisher Road and a second building had been constructed to the east of the existing building.

1356 Ball Road

This property was treed and vacant until 1975 when an apparent house is visible at the northwestern corner of the lot. However, by 1993, the house is accompanied on the lot by a large, long peaked roof building on the eastern side of the parcel and a large area of gravel surfacing or concrete pavement (?) at its north end. These buildings are still present in the 2005 airphoto.

1360 Fisher Road and 1375 Fairfield Road

These properties appear to be under common ownership with each other and the unaddressed lot to the south of 1360 Fisher Road. These three properties appear to have been first developed some time during the 1960's through the construction of two long peaked roof buildings located near the centre of the three lots and a house which fronts on Fisher Road. The buildings apparently contained a commercial poultry operation (see Section 5 below). The buildings (or their ruins) were still seen to be present in 1984 when a large commercial greenhouse was first seen to occupy much of the lot at 1375 Fairfield Road. By 1993, the two long buildings are no longer present however, a second greenhouse is situated within the eastern half of the parcel at 1360 Fisher Road. The area is unchanged on the 2005 airphoto.

1397 to 1417 Fairfield Road

These properties are located about 150 m southwest of 1355 Fisher Road. This area was undeveloped until some time before 1975 when an auto wrecking operation was in business on the site (with an address of 1415 Fairfield Road). The wrecker was apparently in operation until the early ~1990's with the property being vacant in the 2005 air photo.

1375 and 1395 Fisher Road

These properties border 1355 Fisher Road to the south and southwest. The property at 1395 Fisher Road has been a cleared and partially cleared residential acreage since at least 1946. The property at 1375 Fisher Road was undeveloped and treed until the early 1970's when it was cleared but vacant. A single residential building

first appears on the property on the photo taken in 1993 and has remained unchanged since that time except for the continued growth of the treed vegetation.

Unaddressed Galliers Road Lot 6 Parcel

This is the large parcel located directly to the west of 1355 Fisher Road. This property has remained essentially treed and undeveloped, except for an apparent single family residence which was constructed within the central portion of the lot some time between 1962 and 1975 and is still visible in the 2005 air photograph.

Unaddressed Galliers Road Lot 1 Parcel

This property is located immediately north of 1355 Fisher Road at the eastern end of Galliers Road. This property has never been developed and is predominantly fully treed in the 2005 air photograph.

Unaddressed Lot 1 Parcel North of 1345 and 1355 Fisher Road

Portions of this large property were cleared agricultural fields and a residential house in 1950, however, most of the property has never been significantly developed. Gravel extraction began at the north western end of this parcel during the 1990's that is seen to be continuing in the 2005 air photos. The parcel also contains a ~14 m square lined pond that appears to be associated with the gravel extraction operation.

4.5 Site Registry

The B.C. Ministry of Environment Site Registry is a database maintained by the BC Government that contains information on the contaminant status of properties in BC. The Site Registry was searched on June 23, 2011 using a 500 m radius Area Search procedure based on the centre of the property at 1355 Fisher Road. A PID search was also conducted for the property at 1355 Fisher Road. The search results are included in Appendix C.

The Area Search was centered at latitude 48° 41', 33.5", longitude 123° 35' 47.4" and returned four search results within 500 m of the subject property. The addresses for the four sites are:

- 1354 Ball Road - ~150 m southeast of the subject property. The source of the contamination at this property is unknown.
- 3740 Trans Canada Highway - ~400 m north of the subject property, based on the air photo review, it is suspected that this property was previously an auto wrecker.

- 1461 Fisher Road - ~400 m southwest of the subject property. The source of the contamination at this property is unknown.
- 1415 Fairfield Road - ~150 m southwest of the subject property, based on the air photo review this property was previously an auto wrecker.

Based on our current understanding of the regional groundwater flow direction, none of the listed properties are directly up gradient of the site. The Synopsis Report for the property at 1354 Ball Road was obtained from the Site Registry and is included in Appendix C. The synopsis report contains little information but notes the status of the property is "Inactive – No Further Action". The report also notes it is a "small site" with "simple contamination". These refer to fee classes which are no longer in use at the MoE, but indicate that the contamination is likely restricted to a single class of substances (e.g. metals or hydrocarbons etc.) but does not provide any additional detail. We understand from Hubert Timmenga of Timmenga Associates Inc. (a consultant working for the property owner at 1355 Fisher Road) that a former owner of the site was Pacific Energy Woodstoves Ltd.

The PID search for 1355 Fisher Road (PID 001-377-892) returned a "Nil" search result indicating that the property has not been included in the Ministry of Environment Site Registry.

4.6 Fire Department Records

The Malahat Fire Department is a volunteer department and we are not aware that they collect any underground storage tank installation or removal information.

4.7 Other Municipal Records

The CVRD provided us with a June 25, 1985 CVRD memo to the Electoral Area Services Committee relating to an application from the then property owner of 1355 Fisher Road (i.e. Grace Bishop) to subdivide and rezone the property. The memo was accompanied by a 1984 surveyed site plan, both of which are included in Appendix C. The "existing use of property" is listed on the memo as: "Kennel plus ancillary car repairs, two single family dwellings". The sewage disposal on the property is listed as "septic". The site plan shows the pre-subdivision property layout including a "principal dwelling", an "old house", two dashed-line "sheds" (potentially indicating they were recently removed or were in severe disrepair?), one dashed-line barn and a solid-line shed, all principally located within the central and eastern portions of the current property boundary. The location of the kennel or where "ancillary" car repairs were carried out is not indicated.

The CVRD also noted that they did not have any records indicating that the site was a quail farm or that hide tanning was carried out on the property, as has been indicated from other sources (see the following sections).

The CVRD provided us with analytical data obtained from the analysis of a sample of fertilized irrigation holding water from the Gamboa Greenhouses at 1360 Fisher Road. The laboratory report containing the data is included at the back of Appendix C. The irrigation water data is discussed in Section 5.

The CVRD also provided us with some laboratory data for water samples collected from 1375 Fisher Road (immediately south of 1355 Fisher Road). The data from this property indicate that the water from the well at this site meets Canadian Drinking Water Quality Guidelines for the parameters tested (e.g. nitrates and other routine parameters). However, our well construction details summary table (in Appendix C) indicates that the well screen at 1375 Fisher Road is significantly deeper than the adjacent wells at 1355 and 1360 Fisher Road and as such, the data from this well is not directly comparable to data from other wells.

The CVRD told us that the small lot residential subdivision at 1397-1417 Fisher Road was constructed during 2009 and the site is not connected to a municipal sewer system. We understand the development has an on-site septic system with in-ground discharge of waste water.

4.8 Other Sources of Information

The 1:50,000 scale map NTS 92 B/12 used for Drawing 17-971-13-100 (see Appendix A) was published in 1993 by Energy Mines and Resources Canada, but based on air photos taken in 1989. The map includes a “Dump” label located immediately to the west of the subject property however, it is not clear from the map to which property the label is referring.

We contacted the CVRD to determine if they were aware of or could provide any information related to the possible presence of a dump in the vicinity of the subject property during the late 1980’s. However, they responded that they were not aware of any dump in the Fisher or Galliers Road area. The basis for the Energy Mines and Resources Canada interpretation of a dump is unknown as no potential dump sites were noted on the 1984 or 1993 air photos reviewed for this project (see Section 4.4). It is suspected however, that the label most-likely refers to the previous automotive wrecking yard located at 1397 – 1417 Fairfield Road.

Visual records from the Province of British Columbia On-line Archive were searched using the key word “Cobble Hill”, in the hopes of locating early photographs of the subject property or adjacent sites however, no relevant photos were located.

4.9 Previous Reports

2010 EBA Report

The CVRD provided Thurber with a copy of an EBA Engineering Consultants Ltd. (EBA) report “Environmental Review 1355 and 1345 Fisher Road, Cobble Hill, British Columbia” (November 23, 2010) and a subsequent report update letter dated December 20, 2011. The main EBA report included a sub-consultants report produced by Transform Compost Systems which focused on the current site activities at both 1345 and 1355 Fisher Road and how they related to the potential for odour emissions at each site. While key elements from both reports are summarized below, the reports include many specific details related to the operations at each site which are not repeated here. We understand that the reports are currently available on the CVRD web page at: http://www.cvrd.bc.ca/index.aspx?NID=1294

The CVRD retained EBA to conduct the environmental review and odour generation and mitigation strategies investigation at the Fisher Road Recycling Facility at 1355 Fisher Road and the Central Landscape Supplies Ltd. mixed yard and garden waste composting facility at 1345 Fisher Road. The EBA review also included an assessment of the local aquifer, groundwater and surface water quality and other potential environmental impacts from the industrial operations at the two properties.

The primary scope of work for EBA included:

- Conducting a desktop review of the Cobble Hill area aquifers and water well records;
- Conducting a site visit to 1355 and 1345 Fisher Road to observe the setting, layout of the land and operating facilities;
- Identifying potential receptors of leachate runoff and provide comment on the suitability of the current monitoring and sampling program;
- Conducting an odour analysis, site visit and review of mitigation strategies;
- Interviewing the operators of the two facilities to ask questions pertaining to the historical use of the sites and reviewing the current monitoring and sampling programs at each site to assess all potential contaminants of concern (PCOC).
- Collecting groundwater samples from the on site groundwater monitoring well and four other wells located near the composting facilities.
- Collecting samples of finished compost;

- Collecting water samples from the leachate collection pit at 1345 Fisher Road;
- Collecting a water sample of the runoff from the compost windrows at 1355 Fisher Road;
- Assess the potential for odours to be generated at each site;

Some of the report findings augmented with Thurber's observations and comments are briefly summarized below, including descriptions of the operations at 1355 Fisher Road:

1. The property at 1355 Fisher Road was originally developed as a rural residential property however, EBA received anecdotal information that a chicken and or quail farm operated on the site circa 1993 to 2000. They report that a 25 by 75 ft barn was erected adjacent to the water well at the site to house chickens/quail and it was reported that manure was stored outside the barn near the well. However, it should be noted that the air photo interpretation conducted by Thurber generally does not provide observational evidence for the existence of a barn at that location. However, a large number of out buildings were observed in other areas of the site.

2. The existing site well at 1355 Fisher Road was drilled in 1972. It is 66.4 m deep and encountered water at 57 m below the surface. The soil stratigraphy encountered by the well driller (as noted on the well log) consisted entirely of sand and gravel soil types with no evidence of an on-site soil confining layer. However, drillers logs are notoriously unreliable in regards to geological descriptions and visual site observations made by Thurber confirm the presence of an upper 2 to 3 m thick till layer (containing irregular sand lenses) near the well site (see Section 3.3).

3. The Ministry of Environment's Groundwater Resource Atlas indicates that the local aquifer is classified as a sand and gravel aquifer that has moderate demand and a low vulnerability. However, another approach using DRASTIC analysis found that the local aquifer has a medium to high intrinsic vulnerability.

4. The Fisher Road Recycling Facility operate a commercial compost facility producing Class A Compost (from a variety of source materials) with an annual operating capacity of 18,000 metric tonnes (although Thurber understands that they produce significantly less). Composting on the site began under the Westcoast Landfill Diversion Corporation in 2000 who sold the property to Fisher Road Recycling in March of 2006. The new owners have made a large number of modifications and upgrades to more responsibly operate the facility including: indoor receiving and processing and doors that are only opened to

allow equipment access, outdoor aerated impervious working pads, leachate collection and recycle systems, curing on an aerated floor within the receiving and processing buildings and installation of biofilters to improve odour control processing.

5. EBA reported that the indoor operation consists of a 36 x 40 m tarp structure that is situated on an asphalt pad. This structure contains the receiving area, in-vessel composting boxes and mixing area and secondary processing. The primary composting process includes 10 days in one of the in-vessel boxes followed by 14 days curing on an aerated floor in the same building. Following curing, the compost is then moved into outdoor windrows for storage. We understand that the process described by EBA is not the current practice. Thurber's findings regarding the site operations are presented in Section 5.

6. The facility contains generated leachate and recycles the leachate by adding it to the curing compost piles within the operations building which is underlain by a bermed pad and sealed retainer walls. The buildings doors are protected by a grate and gutter system. Leachate generated in the biocells is collected at the bottom end of each cell in a collection channel and piped into a collection box that is monitored electronically. The operator has stated when the collection tank fills, a liquid waste management contractor is called to collect and dispose of the leachate off site.

7. Water from the on site groundwater well is also used to add moisture to the compost piles as the facility attempts to collect as much moisture as possible to assist with and expedite the curing process.

8. During the EBA site visit, unscreened Class A compost piles were stored on the native ground surface. Once the compost is screened, it is stored on a separate area with a concrete pad that did not have a raided edge to retain leachate runoff.

9. The screened and unscreened compost storage areas are located within the northern end of the site, not far from the groundwater well. EBA reported that the well does not have a surface seal and was originally used for domestic drinking water purposes. The well is now used to irrigate the compost processing piles. The well is also shared with the composting facility at 1345 Fisher Road. We understand that the operator at 1355 Fisher Road is required to test the groundwater quarterly for a number of nitrogen-based parameters, pH, BOD, fecal coliform and phosphorous.

10. Surface runoff from the site occurs during periods of heavy precipitation mostly during the late autumn, winter and early spring months. Runoff generally flows down the site access road and is directed into a swale collection area located adjacent to Fisher Road, water in the swale, if present during monitoring events, is sampled and tested for the required monitoring parameters. The water in the swale eventually seeps into the ground.

11. The Fisher Road Recycling facility applied to the CVRD to amend their operating plan to include a materials recycling drop off centre. The Fisher Road Recycling web page (accessed June 24, 2011) indicates that they currently accept a large number of recyclable materials including: tires, oil waste, drywall, asphalt, batteries and a large number of different plastic items among others.

12. The composting operation at 1345 Fisher Road (Central Landscape Supplies Ltd.) processes Class A compost from yard and garden materials. The facility has been operating since 2006. The operations at this site are similar to those occurring at 1355 Fisher Road however, the operation is completely outdoors, has a smaller design capacity and accepts a more limited range of organic materials for composting. Leachate and precipitation runoff that is generated by the in-process material is directed to a leachate collection pit constructed of grouted concrete blocks. Finished compost material is stored on natural ground in windrows with no leachate management system.

13. The EBA report notes that the groundwater data from the well at 1355 Fisher Road exceeds the Guidelines for Canadian Drinking Water Quality (GCDWQ) for hardness (310 mg/L vs 80 to 100 mg/L), total dissolved solids (563 mg/L vs 500 mg/L), nitrate (45.9 mg/L vs 10 mg/L), nitrate plus nitrite (47 mg/L vs 10 mg/L) and total coliforms (120 MPN/100 ml vs 0 MPN/100 ml). The EBA report includes data for the well at 1355 Fisher Road going back as far as April of 2002 which shows nitrate and other quality parameters similar to those presented above. The groundwater metals data from the well were all within GCDWQ and applicable CSR standards (which are equivalent for the site).

14. The EBA report notes that groundwater data from wells located on nearby properties also exceeded GCDWQ, most significantly for nitrate (17.1 mg/L) and hardness (172 mg/L) at a well at 1360 Fisher Road located ~50 m southeast of the subject property, and total coliforms (40 MPN/100 ml) in the well at 1425 Galliers Road which is located about 120 m northwest of the subject property.

15. While one sample of runoff water collected from the swale at 1355 Fisher Road was found to contain a nitrate concentration of 50.3 mg/L, the remainder of the swale water samples collected during 2008 to 2010 were less than the GCDWQ (and CSR) standard of 10 mg/L. However, fecal coliform data from the swale has consistently exceeded the guidelines with concentrations of up to 80,000 CFU/100 ml measured, the source of the coliform has not been confirmed. Ammonia concentrations in most of the samples collected are also elevated above anticipated background levels however, there are no GCDWQ guidelines for ammonia.

16. Five of the six samples of compost soil from 1355 Fisher Road collected during September 2010 were found to exceed Organic Matter Recycling Regulation (OMRR) standards for fecal coliforms (e.g. 2,300 to 460,000 MPN/kg vs 1000 MPN/kg), while the metals results for the compost were found to be less than OMRR (and CSR) standards if the minimum compost pH is 5.5. A number of the CSR soil standards are pH based (including zinc, which was found to range from 161 to 277 mg/kg in the compost) however the pH of the compost was not determined by EBA.

17. While analysis of the compost nitrogen levels found low levels of nitrate (ranging from <0.7 mg/kg to 20 mg/kg) in the compost, the ammonium concentrations were high (ranging from 328 to 1530 mg/kg) with total nitrogen concentrations ranging from 0.8% to 1.54% (i.e. 8,000 to 15,400 mg/kg). Thurber understands that these nitrogen levels are typical of compost produced at the site.

18. The EBA analytical data has not been appended to this report, but can be found in the original EBA report which we understand, is currently posted on a CVRD web page at: http://www.cvrd.bc.ca/index.aspx?NID=1294.

19. The Transform Compost Systems report provides a description of the composting infrastructure, site procedures and operating plans for both 1345 and 1355 Fisher Road and provides a number of recommendations relating to specific improvements to infrastructure, procedures and operating plans. Thurber understands that the recommendations provided in the Transform Compost Systems report are being implemented but are not yet complete.

2006 Wittich Stage 1 PSI Report

David Laing of Fisher Road Recycling allowed us to view a copy of a Stage 1 Preliminary Site Investigation (PSI) report that his father commissioned for the property at 1355 Fisher Road prior to their acquisition of the site in 2006. The report

was completed by Wittich Environmental Services Ltd. (Wittich) on December 7, 2005.

Some of the report findings are summarized with a few comments provided by Thurber (as indicated) below:

1. The PSI report was produced for financial purposes only and does not contain all of the required information to be reviewed by the Ministry of Environment.

2. The report notes that a CVRD works yard is located to the north of the property with forested areas to the west and southwest, and to the southeast of the subject site (across Fisher Road) is a “cabinet making operation”.

3. The property at 1355 Fisher Road is serviced by BC Hydro and has a private septic field system and onsite well for potable water.

4. A request for a search of CVRD records relating to the site returned little information, other than the site was occupied by a single family dwelling.

5. The report notes that soil sample results were provided to Wittich by Westcoast Landfill Division Corporation (the then current property owner) for the compost produced on site. The Wittich report states “the results of the samples show all concentrations below the BC Contaminated Sites Regulations (CSR) Industrial land-use criteria for parameters that were analyzed for”. However, Thurber observed that the parameters analyzed were not described in the report and a copy of the soil sample results provided to Wittich was not included in the Wittich report.

6. The report suggests that the groundwater flow direction is anticipated to be towards the south based on the prevailing topography and a “moderate” 2 to 10 m depth to groundwater was considered likely. This supposition has now been shown to be incorrect by groundwater monitoring work previously conducted by Thurber.

7. A site visit to 1355 Fisher Road was conducted on November 4, 2005 for the purpose of visually inspecting the current site activities and looking for visual clues relating to potential sources of contamination.

8. The results of the site visit include the observation that three fixed buildings were located on the site and one mobile home. One of the buildings was an old abandoned residence located near the centre of the lot while the other two were noted to be new and included an open-aired [compost] storage building

and a “kiln” used during the on-site production of compost. They note that there is a limited area in front of the two buildings that is asphalted with the remaining areas of the site dirt and grass covered. The mobile home was located at the southwest corner of the site while tarped piles of compost and waste plastic material were also present at an unspecified location on the site.

9. The “kiln” building [composting vessel] was inspected with “no noted areas of potential, or actual, environmental concerns”. However, the fate of composting leachate generated on site was not discussed in the report.

10. It is noted in the report that there was an on-site boiler (at an unspecified location) but it was not inspected as it was “not accessible”.

11. Two 500 gallon above ground fuel oil storage tanks (AST’s) located “near the centre of the lot (adjacent the old onsite dwelling)” are noted to have been used for fueling on site equipment. An unused 250 gallon tank was located nearby. The report notes that there is obvious surface staining around the AST’s “as a result of spillage during refueling”. An inspection of soils underneath the stained areas “showed that the contamination was limited to surface areas only” and estimated the observed contamination extended as deep as 20 cm below the surface. However, no data supporting these conclusions was provided.

12. The report included a number of site photos, including one showing apparent flooding within the “swale” portion of the site.

13. An interview was conducted with the potential purchaser, Dr. Jim Laing regarding the previous site history. The interview revealed that the site had been operated by Westcoast Landfill Division Corporation for approximately 5 years and the site produced compost for retail purposes. Mr. Laing stated that no burning was conducted on the site and all of the waste piles on the property would be removed off site prior to any transfer of ownership. The then current property owners were apparently not interviewed directly.

14. The report concluded that the historic site activities (e.g. the hobby farm) were thought to represent a low environmental risk. The activities by Westcoast Landfill Division Corp. were considered to represent a “moderate environmental concern…due to current management practices”. The hydrocarbon stains around the AST’s were noted, as were the large piles of “waste materials” containing large amounts of discarded plastics. However the report notes:

> *"It is WES's [Wittich's] opinion that the riches [sic] source of potential onsite contamination would be from the [compost] "product", and the fact that the results of the soils [sic] samples collected from the compost piles "product" were found to be below the applicable industrial land use standards set out by the…CSR, there is no current concern of massive contamination on site (although the current onsite operation has only been present for some five years)."*

15. The likelihood of contamination from adjacent sites was also deemed to be low.

16. The report recommendations include that a baseline soil study be completed after the site has been cleaned and all garbage and waste piles have been removed, with additional soil samples collected one year later for comparison of results. The report notes that if there is an observed increase in contamination, consideration should be given to [changes] in the handling and storage of the waste/product. It is also noted in the report that "sealing the surface may be required to solve any potential problem".

17. The report also recommends that once the site is cleared, the suspect soils around the AST's should be removed in accordance with MoE requirements which would include the collection and submission of confirmation soil samples. We are not aware if any of these recommendations were carried out.

5.0 SITE VISITS AND INTERVIEWS

A site visit was conducted at 1355 Fisher Road by Paul Wilson, P.Geo. of Thurber on June 27, 2011 for the purpose of viewing the current site operations and interviewing persons knowledgeable about the site history. The visit was conducted in the company of Mr. David Laing (the property owner) and Dr. Hubert Timmenga (of Timmenga & Associates Inc.) an operations consultant to Mr. Laing.

Adjacent properties were also visited on June 27, 2011 including the property at 1360 Fisher Road (Gamboa Greenhouses) and 1345 Fisher Road (Central Landscape Supplies Ltd.) where interviews were conducted with Mr. Edward Gamoba (Gamboa Greenhouses) and Mr. Peter Butler (Central Landscape Supplies).

The site visit at 1355 Fisher Road included access to all portions of the site, while the site visit at 1360 Fisher Road included the northern-most greenhouse, the western side of the property and the vegetable packing area located in the site residential building. Publically accessible areas on other properties adjacent to 1355 Fisher

Road were also viewed during the site visit. A selection of photos taken during the site visits are included in Appendix D. A large number of additional site photos are included in the EBA (2010) report.

5.1 1355 Fisher Road

Items of interest gathered during the site visit and interviews at 1355 Fisher Road are summarized below, as are findings determined by our review of the Fisher Road Recycling web page at http://fisherroadrecycling.com on July 12, 2011. Please refer to the site plan Drawing 17-971-13-103 for site location references:

- Fisher Road Recycling is a commercial organic material composting facility (producing Class A compost) and recycled materials drop off and transfer station. The organic materials composted include yard waste, food and fish processing waste and biosolids. We understand that while Fisher Road Recycling has the capacity to produce 18,000 tonnes annually, they are currently processing about 6,000 tonnes of incoming materials. A wide range of materials are accepted for recycling transfer including waste oil, paint, household garbage, metal, plastics, tires, paper, construction waste, fluorescent tubes and batteries etc.

- The Fisher Road Recycling business began operations on the site in 2006 when the property was sold by Westcoast Landfill Diversion Corp., who operated a similar, yet less well developed, commercial composting facility on the property.

- The recycling transfer drop off area is located within the eastern side of the property and includes a recycling processing area and drop off bins and sheds (Photo 1). This portion of the site is located on a relatively new concrete pad (~2 years old), which is internally sloped to a central drain connected to oil/water separators that discharge the runoff water to a vegetated swale area located next to Fisher Road (Photo 8). Roof runoff water collected from the nearby compost curing building is also directed to the swale, but is not passed through the oil/water separator.

- Mr. Laing stated that when his family purchased the property in 2006, the only buildings present on property at that time were the Herhoff in-vessel composting cells, the old farm house and the well pump house (and possibly other small out buildings). Since that time, Fisher Road Recycling has constructed the covered compost receiving and processing building (attached to the Herhoff composting vessels), the recycling sheds (bins), biofilter

buildings, outdoor curing area air floor pads, leachate ponds and other hard surface areas at the northern end of the property (see Drawing 17-971-13-103).

- The compost receiving and processing building is situated on asphalt pavement (Photo 4) and contains a number of air floor compost curing stations and the composting vessels. Mr. Laing stated that the composting process is monitored by computer with temperatures maintained at 55°C for 120 hours inside the vessel with the compost remaining in the vessel for about 10 days. Leachate generated by the composting process is recycled back into the compost vessel with any excess temporarily stored in storage tanks (located in the vessel control room) for later re-use (the vast majority) or off site disposal by a hazardous waste removal contractor.

- Once the compost is removed from the vessel, it undergoes secondary composting inside on aerated floors for 5 to 6 weeks.

- Condensation water from the composting process is collected in an above ground tank and treated with UV light before it is either re-used on the compost piles or used to wet the biofilters.

- The compost receiving and processing building is connected to three biofilter buildings as an odour control measure (Photo 2). The biofilters are essentially piles of wood chips (in long poly-covered buildings) stacked over a perforated air outlet.

- Once the compost is removed from the compost receiving and processing building, it is then stored outdoors where final curing takes place for 5 weeks or more both on concrete-floored air pads (curing area pad on Drawing 19-971-13-103 and Photos 2 and 3) and on bare ground within the northern portion of the property. Runoff and any leachate from the pads is intercepted by a drain system and passed through an oil/water separator before being directed to two leachate ponds. The leachate ponds are lined and fitted with an aeration system to reduce odours. The leachate in the ponds is then re-applied to the curing compost piles located on the air floors both inside the processing building and outdoor air floors.

- The northern portion of the property is used as a yard waste chipping area (Photo 6), compost screening area (Photo 7) and for storage of maturing compost piles (see Drawing 17-971-13-103). The yard waste chipping and

screening areas are underlain by concrete pavement where storm water is collected, while the area used for maturing compost is underlain by bare soil.

- The existing compost curing air pads are being expanded, with the construction of an adjacent pad (and leachate pond) located to the east and south of the well pump house (Photo 3).

- Mr. Laing noted that the groundwater well in use on site supplies water to the composting process and that it contained high levels of nitrates when the property was purchased in 2006. This statement is supported by 2002 data presented in the EBA report which shows a nitrate concentration in the well of 56.7 mg/L which is comparable to the most recently available measured well concentration of 45.9 mg/L (taken August 2010).

- A second, abandoned well was recently discovered on the property within the eastern portion of the compost maturing area (see Drawing 17-971-13-103). The 6" steel casing on the well was covered by an overturned plastic bucket which was in-turn buried by soil when it was hit by a loader working in the area. The well casing is apparently blocked at about 15 feet below the ground surface, but the nature of the blockage is unknown.

- There is at least one above ground fuel oil tank located on site. A small above-ground tank was observed in the small office located in a trailer adjacent to the compost curing building.

5.2 1360 Fisher Road

Items of interest gathered during the site visit and interview at 1360 Fisher Road are summarized below. This site was visited as it is directly up gradient of 1355 Fisher Road and the history of the site and current greenhouse operations suggest a significant potential for impacts to local groundwater quality. Photos from the site visit are included in Appendix D.

- Mr. Gamboa bought one of the lots making up the property in 1990 and purchased the others in 2000 and noted that the site was used as a greenhouse operation long before he purchased it. The site is currently occupied by a 33,000 ft^2 glass greenhouse, a 24,000 ft^2 poly greenhouse and a residence where the lower level is used for vegetable packing and short term storage (see Drawing 17-971-13-101). The first greenhouse was constructed on the site in 1975. The greenhouse operation produces tomatoes, cucumbers and peppers.

- There are two groundwater wells on the property including one well located within the vegetable packing area of the residential house at 1360 Fisher Road and a second well located to the west of the greenhouse at 1375 Fairfield Road. Well water from the property is used to water the greenhouses and as a source of drinking water for the site residence.

- The greenhouses are currently heated by gas, but were originally heated by an oil-fired burner, and later (in the mid-1970's) by a sawdust burner-heated boiler. However, the sawdust storage shed and burner building burnt down in the 1980's.

- Pest control in the greenhouses is carried out by using biological control without pesticides. Biological controls have been used in the greenhouses for at least 20 years.

- The irrigation water is held in a storage tank located in each greenhouse (Photo 10), where Mr. Gamboa mixes individual fertilizer components and other minerals to the water for use as fertilizer. Mr. Gamboa stated that his water use varies throughout the year but typically gets up to between 10 and 12 m^3 per day in the summer. The mixing is done on site and includes the following list of chemicals: calcium nitrate, potassium nitrate, sulfuric acid, potash, ammonium nitrate, magnesium sulfate, copper, bicarbonate and others. A sample of the fertilized irrigation water from 1360 Fisher Road was obtained by the CVRD and submitted for analysis of routine water quality parameters and total metals. The laboratory report presenting the data is included at the back of Appendix C. Our review of the laboratory data indicates that the irrigation water sampled by the CVRD contained 170 mg/L of total nitrogen, including 110 mg/L of nitrate (which greatly exceeds the CSR Schedule 6 drinking water standard of 10 mg/L nitrate) and total metals concentrations that are elevated (above anticipated background groundwater metals concentrations) but do not have the potential to exceed CSR Schedule 6 drinking water standards.

- It was observed that the watering storage tank, fertilizer mixing vessels and fertilizer products were located in the portion of the greenhouse underlain by a concrete slab (Photo 10).

- The plants in each greenhouse are grown in individual plastic-wrapped soil bags that are held in a suspended catchment trough above the poly-covered bare soil floor. A drip irrigation system delivers watering water directly to each

soil bag however, drips of fertilized watering water were observed to occur onto the poly sheet.

- During the original interview Mr. Gamboa stated that he believed that the previous buildings located within the central portion of the property (see Section 4.4) may have held chickens or some other poultry.

- During a later telephone interview with Mr. Gamboa during late November, 2011, Mr. Gamboa stated that he had questioned a previous owner of the property who lived on the property from ~1970 until 1974 (a Mr. Taylor) about the previous centrally-located site buildings. Mr. Taylor apparently recalled the buildings only as foundations and partially standing ruins, but it was his understanding that they had previously been part of a "chicken operation" before he owned the property.

5.3 1345 Fisher Road

The following information was obtained from our June 27, 2011 interview with Mr. Peter Butler of Central Landscape Supplies Ltd. or obtained from the Central Landscape Supplies web page at: http://centrallandscapesupplies.com/ on July 12, 2011.

- Mr. Butler noted that Central Landscape Supplies began operations on the site in approximately 1992.

- Mr. Butler stated that the property at 1357 Fisher Road was occupied by Cowichan Joinery for about 30 years and the property was only recently taken over by Raven Metal Products.

- Central Landscape Supplies accepts yard and garden waste, which is composted on site within an outdoor composting area located near the western end of the property (Photos 11 and 12), and mixed with other soil products to produce various soil mixtures including: garden mix topsoil, sandy loam, screened and unscreened compost and composted manure-mix soil. Water for the composting operation is obtained from the well located at 1355 Fisher Road.

- Mr. Butler recalled that during the late 1990's, the property at 1355 Fisher Road was occupied by a farm that included the keeping of a large number of quail. Mr. Butler stated that the quail were kept in a building attached to the owner's house that also contained a well. Mr. Butler also noted that the owner

at that time also tanned sheep hides on the property as a sideline business. He apparently accepted hides from local sheep farms. Mr. Butler noted that the property was messy and included a pile of quail waste and sheep carcasses. This assertion has not been confirmed by other means.

6.0 DISCUSSION AND CONCLUSIONS

6.1 General

The findings of this investigation (as discussed below) indicate that in general, both historic and current activities at 1355 Fisher Road and adjacent sites at 1345 and 1360 Fisher Road have the potential (singularly or in combination) to have resulted in the observed groundwater nitrate contamination in the well at 1355 Fisher Road. Past and present activities at each of these sites (and possibly others) also have the potential to result in significant soil and or groundwater contamination that could migrate away from the respective points of origin to impact nearby adjacent sites.

6.2 1355 Fisher Road Site

Samples of water collected from the well at 1355 Fisher Road have been analyzed for routine parameters since at least 2002 and generally indicate the presence of nitrates in the groundwater in significant concentrations ranging from 38.8 mg/L to 72.2 mg/L which greatly exceed the common Canadian Drinking Water Quality Guideline and the CSR Drinking Water standard of 10 mg/L.

The source of the observed nitrate in the site well water in 2002 is unknown, but based on the findings of this report, the following (listed in no particular order) are identified as potential sources:

- Suspected poor poultry/farm waste management practices (and possible hide tanning waste) during the 1990's and possibly earlier.

- Leaching of nitrogen-rich compounds generated on site after 2000 by Westcoast Landfill Diversion's composting operations;

- Migration of contaminated groundwater from adjacent sites including 1345 and or 1360 Fisher Road (or other up-gradient sites) where nitrogen compounds and other potential contaminants are used and generated;

- Some other unknown source.

The concept that commercial compost operations could pose a risk to local groundwater quality (i.e. have the "potential" to result in groundwater contamination) is supported (in part) by several provincial guidance documents including a composting factsheet produced by the British Columbia Ministry of Agriculture and Food entitled "Composting Environmental Concerns" dated September 1996 (included in Appendix E) and in Section 4 (and other sections) of the B.C. Ministry of Environment Organic Mater Recycling Regulation (OMRR) guideline companion document entitled "Compost Facility Requirements Guideline: How to Comply with Part 5 of the Organic Matter Recycling Regulation" (2004) (available on-line at: http://www.env.gov.bc.ca/epd/mun-waste/regs/omrr/pdf/compost.pdf.).

The degree to which the current site activities at 1355 Fisher Road (i.e. since 2006) may be contributing to the observed post-2006 groundwater quality (if at all) is unknown. While it is apparent that the current property owners have significantly reduced the risk from ongoing operations by building and maintaining an array of waste control infrastructure on the property (e.g. concrete pads, drainage and leachate catchment and control infrastructure including oil/water separators, a covered compost processing building, leachate treatment and biofilters etc.) some risk from current operations likely remains. The primary items of potential concern include spills or leaks of liquid leachate (from the tanks, ponds or piping systems) and leachate runoff generated during the wet winter months from compost stockpiles situated on bare ground within the compost maturing area. As noted above, the above risks were also present (and perhaps to a greater degree) during the ~2000 to ~2005 period when the site was owned and managed by Westcoast Landfill Diversion Corporation as little or none of the existing leachate control infrastructure was in place during that period.

A number of other site activities have taken place on the property that have had the potential to result in significant soil or groundwater contamination. These include:

- Ancillary automotive repair (potentially a relatively minor contributor of metals and or hydrocarbon contamination) – 1980's,

- Hydrocarbon spills or leaks from past and present on-site fuel storage tanks – 2000 to present,

- Potential spills of soluble or fine-grained potentially-contaminating recycling materials (e.g. batteries, paint, metals etc.) that are temporarily stored on the property, where the runoff water is collected and discharged to the swale at the eastern side of the lot – since the recycling drop off centre has been located on site (approximately 2008 to present). Metals contamination from this source (if present) would be expected to be found in the vicinity of the swale along

Fisher Road as this area is the source of the runoff discharge once the discharge passes through the oil / water separator.

While the property at 1355 Fisher Road appears to be generally underlain by a ~2 to ~3 m thick layer of variable silty till blanket (on top of the deeper granular soils), the till cover may be intermittent and heterogeneous in nature as it has been observed to contain sorted sand lenses in at least one area. As such, it is possible that the till offers little in the way of reliable groundwater protection for the underlying aquifer.

The risk of contaminant migration to and away from the well site at 1355 Fisher Road is generally high due to the nature of the underlying aquifer including the inferred rapid groundwater flow velocity (i.e. 0.15 m/day) in the area. This finding is likely applicable to all of the sites covered by this assessment.

6.3 1360 Fisher Road (and 1375 Fairfield Road) Site

The property at 1360 Fisher Road (and 1375 Fairfield Road) is immediately up gradient of 1355 Fisher Road and has a long history of use as a commercial greenhouse operation (since 1975). The property at 1360 Fisher Road was also apparently the site of a commercial poultry operation some time before 1970. Based on the apparent size of the previous barns at this site, it is likely that the commercial poultry operation at 1360 Fisher Road was significantly larger than the possible poultry operation noted at 1355 Fisher Road. Potentially contaminating activities at this property include (or have included):

- The long time (and current) use of fertilized watering water containing nitrate (recently tested at 170 mg/L of total nitrogen, including 110 mg/L of nitrate) in the greenhouses over areas of soil that are only covered by plastic groundsheets.

- Potential spills or leaks of petroleum hydrocarbons from past fuel storage tanks,

- Unknown poultry barn waste management and disposal procedures.

While the most-recent nitrate concentration in the groundwater well at 1360 Fisher Road is apparently lower than in the well at 1355 Fisher Road (~17 mg/L vs 48 mg/L), it is not possible to say at this time if the results from 1355 and 1360 Fisher Road (or wells on other properties) are comparable or applicable to use in determining the scale of the risk at each site due to potential dilution effects (i.e. due to different well depths, well screen interval lengths and or pumping rates). Groundwater data from the well at 1375 Fisher Road (located between 1355 and 1360 Fisher Road) is low for

nitrates however, it is our understanding that this well is screened about 10 m deeper into the underlying aquifer than the wells at 1355 and 1360 Fisher Road so is of little use for either confirming or ruling out potential contaminant migration from 1360 Fisher Road to 1355 Fisher Road.

6.4 1345 Fisher Road Site

The available information for the composting operations at Central Landscape Supplies suggests that the ongoing composting operations at 1345 Fisher Road also pose a potential risk to local groundwater quality in a manner similar to those already discussed for 1355 Fisher Road.

It is very likely that the property at 1345 Fisher Road is either down gradient or across gradient of the well 1355 Fisher Road. However, the proximity of the potentially contaminating activities at 1345 Fisher Road (to the well site at 1355 Fisher Road), the great depth to the local groundwater table (~57 m), the local gentle groundwater gradient and a probable cone of influence around the well at 1355 Fisher Road make it impossible to rule out contaminant migration from 1345 Fisher Road to the 1355 Fisher Road well at this time. However, potential contaminant migration from the aquifer at 1355 Fisher Road to 1345 Fisher Road (or other adjacent properties to the north) is more likely considering the nature and extent of the underlying aquifer.

6.5 Other Sites

While several other properties in the vicinity of 1355 Fisher Road have current or past uses that suggest the possibility of resulting in soil and or groundwater contamination, in our opinion, none are considered to be likely candidates to have resulted in the observed nitrate contamination in the well at 1355 Fisher Road. These include the past wrecking yard at 1397 - 1417 Fairfield Road, mixed industrial activity at sites on Ball Road, within the Fisher Road commercial / industrial area east of 1355 Fisher Road and septic field systems at a number of residential properties in the area including the current small lot subdivision at 1397-1417 Fairfield Road. None these properties are directly up gradient of the 1355 Fisher Road well site.

We understand that the current residential subdivision at 1397-1415 Fairfield Road is serviced by a common septic system with in-ground effluent discharge which likely represents a source of groundwater nutrient inputs. However, the subdivision was developed in 2009 and as such, could not be responsible for the pre-2009 elevated nitrate levels observed in the well at 1355 Fisher Road. Also, based on the groundwater flow direction measured by Thurber, the subdivision is not directly up gradient of the 1355 Fisher Road well site but is up gradient of a number of

residential-use properties including 1395 and 1401 Fisher Road and at the east end of Galliers Road.

6.6 APEC and PCOC

The findings of this report have led to the determination of areas of potential environmental concern (APEC) and primary potential contaminants of concern (PCOC) at 1355 Fisher Road. The PCOC noted are substances identified as potential contaminants under the CSR. The APEC and PCOC for the property at 1355 Fisher Road are summarized below in Table 4, and on Drawing 17-971-13-104 in Appendix A.

APEC have not been specifically developed for 1345 and 1360 Fisher Road (or other nearby properties) as they are located away from the 1355 Fisher Road well site. However the PCOC at 1345 Fisher Road and 1360 Fisher Road are likely similar to those noted for 1355 Fisher Road and would include nitrates, metals and hydrocarbons and potentially others. An obvious area of concern at 1345 Fisher Road site is the composting processing area which takes up much of the western and central side of the property, while the areas of concern at 1360 Fisher Road (and 1375 Fairfield Road) would include the footprints of the greenhouse buildings (and adjacent infrastructure areas), old barn sites and any current and or past agricultural waste disposal areas.

The limited testing conducted for the well at 1355 Fisher Road is (in our opinion) insufficient to properly address the potential presence of all PCOC at this site. Most of the PCOC identified by this report have not been tested in the well or other nearby wells (i.e. hydrocarbons etc.) and there has only been limited testing of other parameters.

Table 4: APEC and PCOC for 1355 Fisher Road

APEC	Location	Primary PCOC In Soil and or Groundwater	Notes
1	Compost maturing area within the northern portion of the property	Metals, ammonia, nitrate	The primary concerns in this area are from nutrients or metals that could potentially leach out of the stockpiled compost which has been stored in this area since about 2000. Impacts related to the pre- 2000 site history (e.g. farm waste or tanning waste piles or spills) cannot be ruled out.

APEC	Location	Primary PCOC In Soil and or Groundwater	Notes
2	Central and eastern portion of the property in the vicinity of the curing building, outdoor curing pads, leachate ponds and recycling sheds	Metals, ammonia, nitrate, LEPH/HEPH, volatile petroleum hydrocarbons (VPH), polycyclic aromatic hydrocarbons (PAH)	Potential leachate spills are the current primary potential concern in this area, as are potentially significant past site uses including the pre-2006 AST's and leachate generated by waste piles associated with the previous farm and possible automotive repair.
3	Swale adjacent to Fisher Road	Predominantly metals, ammonia, nitrate, LEPH/HEPH, VPH, benzene, toluene, ethylbenzene, styrene, xylenes (BTEX), PAH	This swale has been the site of runoff water accumulation and infiltration on the property since at least 2000. While most of the current runoff discharged to the area passes through one or more oil-water separators, we understand that the current drainage control system is only a few years old.

The volatile PCOC's listed above (i.e. ammonia, BTEX constituents, VPH and possibly others) should also be considered as PCOC's for vapour phase contamination at the site.

While several forms of hydrocarbons are noted as PCOC, it is likely that the risk posed by lighter-end hydrocarbon products (e.g. LEPH, BTEX and VPH) is lower than most of the other parameters mentioned due to anticipated natural bio-remediation of these materials since these materials were used or spilled on site.

A number of the past and present site uses at 1355 Fisher Road are listed in Schedule 2 of the CSR, and as such, could trigger entry of the site into the CSR process with future applications for site redevelopment, subdivision or rezoning etc.

6.7 Recommendations

The following recommendations are intended for the CVRD who commissioned this report.

The project objectives for this assessment were to determine potential source(s) of the observed groundwater contamination at 1355 Fisher Road, determine if other potential contaminants (i.e. other than those already identified) also pose a potential risk, as well as providing recommendations for the design and methodology relating to a planned future groundwater investigation. It is likely that a phased groundwater investigation incorporating a targeted sampling and analytical program and a review of the spatial distribution of multiple contaminants, co-contaminants and other

groundwater attributes will be required to determine the probable source or sources of nitrate inputs with a reasonable degree of certainty.

As an initial step, we recommend that all available groundwater data from all of the areas wells be summarized and tabulated. Initially, once the results of this data compilation are known, a minimum of three additional groundwater monitoring wells should be installed to monitor groundwater quality in key areas adjacent to 1355 Fisher Road. The proposed groundwater monitoring wells should be screened at the same shallow depth below the groundwater table (with identical screened lengths, preferably less than 1.8 m) so that the data obtained can be compared between each well and compared to CSR Schedule 6 and 10 numerical water standards.

The results of this preliminary environmental investigation suggest that initially, additional wells would likely be of most use to determine the source and extent of existing groundwater contamination if they were installed at the following locations:

- Either at the north end of the property at 1355 Fisher Road (within the bare ground compost maturing storage area), or on an adjacent property to the north of the northern property line. However, the possibility of re-activating the newly discovered well in this area should be investigated as it is well placed for use in the groundwater investigation (but may not be screened at the appropriate depth). Groundwater samples collected from this area would provide information regarding the shape and extent of the suspected contaminant plume.

- On the property to the north of the western end of 1345 Fisher Road (Central Landscape Supplies Ltd.). This well would assist in delineating the suspected plume and may provide evidence to assist in determining if the activities at 1345 Fisher Road are a source of groundwater contamination.

- On the Fisher Road right-of-way somewhere to the north of the greenhouse at 1360 Fisher Road (i.e. south of 1355 Fisher Road). This well would be used to assess the potential risk posed by the greenhouse and potential for migration of suspected contaminants away from 1360 Fisher Road.

We also recommend long-term water level monitoring (i.e. over several seasons) to confirm the available measured groundwater flow gradients which were determined using water levels measured over 9 days only. Seasonal groundwater flow direction variations are possible.

Depending on the results obtained from the proposed 3-well groundwater investigation, additional wells and or a control (up-gradient) well may be required to

more fully determine the distribution (and likely source(s)) of groundwater contamination at 1355 Fisher Road. Additional monitoring wells on the east side of Fisher Road (north of Ball Road) and to the north of 1397-1417 Fairfield Road could be part of a future regional groundwater assessment.

We recommend that samples from each of the above proposed groundwater monitoring wells be analyzed for "routine" potability parameters (which includes nitrate), a full nitrogen package (including ammonia), total metals, dissolved metals, light and heavy extractable petroleum hydrocarbons, BTEX and volatile petroleum hydrocarbons.

The use of dual-isotopic evaluation of ^{15}N and ^{18}O in groundwater containing nitrate should also be considered in the new wells (and possibly in nearby existing residential wells) as it may provide an additional line of evidence to assist in evaluating the origin of the observed groundwater nitrates. Dual-isotopic analysis can be useful in differentiating atmospheric and synthetic fertilizer sources from organic fertilizer and septic sources, particularly when combined with other lines of evidence.

The concurrent analysis of co-contaminants such as caffeine and or bio-stable pharmaceuticals may provide evidence indicating a septic-derived source of nitrates. However, even this analysis may be subject to interpretation as it is our understanding that the compost waste stream at Fisher Road Recycling includes (or has included) likely caffeine-containing organic materials such as kitchen waste (likely containing coffee grounds) and or municipally-derived biosolids. We are not aware at this time what effect (if any) the commercial composting process would have on these substances. This analysis could potentially assist in differentiating theoretical contaminant plumes originating from the composting facilities at 1345 and 1355 Fisher Road based on their differing waste stream inputs (i.e. mixed waste stream including kitchen waste and some biosolids at Fisher Road Recycling versus what we understand to be predominantly or exclusively garden waste composting at Central Landscape Supplies).

This environmental assessment has identified a number of APEC and PCOC on the property at 1355 Fisher Road (see Drawing 17-971-13-104). We recommend that a similar detailed exercise be conducted for the properties at 1345 and 1360 Fisher Road. The APEC identified on these properties should be investigated (in accordance with CSR requirements and guidance provided by the Ministry of Environment) at some point through the collection and analysis of both soil and groundwater samples (and possibly vapour samples) for PCOC as part of a series of formal environmental investigations. This work could potentially be undertaken on a voluntarily basis by the current or future property owners, or at the request (or order) of the Ministry of Environment as a result of a number of potential triggers, some of

which include: future applications for changes to zoning, site redevelopment, subdivision, building demolition, excavation, or more directly through the discovery of actual or likely off site migration of contaminants through the soil, groundwater or vapour phases.

Migration of contaminants beyond their point of origin in the vicinity of Fisher Road is a concern considering the nature of the local aquifer, its use as a supply of drinking water and the requirements of Section 60.1 (1) of the CSR which state:

> *A responsible person who carries out a site investigation that discloses that one or more substances has migrated or is likely to have migrated to a neighbouring site and is or is likely causing contamination of the neighbouring site must provide written notification described in subsection (2).*

Subsection 2 includes a description of parties to be notified (i.e. owners of the neighbouring site(s) and the director [of the Ministry of Environment, Contaminated Site Section]), the timeline required for notification (i.e. within 15 days of the responsible person becoming aware) and information to be included in the notification document.

REFERENCES

Air photos: BC243 Frames #46 and 47, 1946; BC1053 Frames #58 and 59, 1950; BC2087 Frames #9 and 10, 1957; BC5057 Frame #54, 1962; BC7760 Frames #245 and 246, 1975; BC84027 Frames #267 and 268, 1984; BCB93095 Frame #277, 1993; BCC98036 Frames #73 and 74, 1998; CRD Air Photo Line 009, RC-13 001, 2005.

BC Sites Registry

Cowichan Valley Regional District files, maps and plans including a zoning map

Historic land titles

British Columbia Ministry of Agriculture and Food, 1996. *Composting Factsheet, Composting – Environmental Concerns*. Dated September 1996.

EBA Engineering Consultants Ltd. 2010. *Environmental Review 1355 and 1345 Fisher Road, Cobble Hill, British Columbia*. Report dated November 23, 2010. Including update letter dated December 20, 2010.

Forgie, D. et. al. 2004. Compost Facility Requirements Guideline: How to Comply with Part 5 of the Organic Matter Recycling Regulation. March, 2004. Accessed from http://www.env.gov.bc.ca/epd/mun-waste/regs/omrr/pdf/compost.pdf accessed on November 25, 2011.

Transform Compost Systems letter "*Notes about Nitrogen Results from Leachate Sample at Fisher Road*" dated November 26, 2010.

Thurber Engineering Ltd. 2011. *1355 Fisher Road, Cobble Hill, B.C. Groundwater Flow Assessment*. Report dated May 16, 2011.

Wittich Environmental Services. 2005. *Preliminary Site Investigation Stage 1 1355 Fisher Road, Mill Bay, B.C.* Report dated December 7, 2005.

Web pages for Fisher Road Recycling http://fisherroadrecycling.com/

Web pages for Central Landscape Supplies http://centrallandscapesupplies.com/

Web pages for the CVRD http://www.cvrd.bc.ca/index.aspx?NID=1294

1:50,000 scale map NTS 92 B/12 (1993)

THURBER ENGINEERING LTD.

STATEMENT OF GENERAL CONDITIONS

1. STANDARD OF CARE

This study and Report have been prepared in accordance with generally accepted engineering or environmental consulting practices in this area. No other warranty, expressed or implied, is made.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report which is of a summary nature and is not intended to stand alone without reference to the instructions given to us by the Client, communications between us and the Client, and to any other reports, writings, proposals or documents prepared by us for the Client relative to the specific site described herein, all of which constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. WE CANNOT BE RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives and purposes that were described to us by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the document, subject to the limitations provided herein, are only valid to the extent that this Report expressly addresses proposed development, design objectives and purposes, and then only to the extent there has been no material alteration to or variation from any of the said descriptions provided to us unless we are specifically requested by the Client to review and revise the Report in light of such alteration or variation or to consider such representations, information and instructions.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT OUR WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS WE MAY EXPRESSLY APPROVE. The contents of the Report remain our copyright property. The Client may not give, lend or, sell the Report, or otherwise make the Report, or any portion thereof, available to any person without our prior written permission. Any use which a third party makes of the Report, are the sole responsibility of such third parties. Unless expressly permitted by us, no person other than the Client is entitled to rely on this Report. We accept no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without our express written permission.

5. INTERPRETATION OF THE REPORT

a) Nature and Exactness of Soil and Contaminant Description: Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel, may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other persons making use of such documents or records with our express written consent should be aware of this risk and this report is delivered on the express condition that such risk is accepted by the Client and such other persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. Where special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

b) Reliance on Provided Information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to us. We have relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, we cannot accept responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons providing information relied on by us. We are entitled to rely on such representations, information and instructions and are not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.

(see over . . . .)

INTERPRETATION OF THE REPORT *(continued . . . .)*

c) Design Services: The Report may form part of the design and construction documents for information purposes even though it may have been issued prior to the final design being completed. We should be retained to review the final design, project plans and documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the report recommendations and the final design detailed in the contract documents should be reported to us immediately so that we can address potential conflicts.

d) Construction Services: During construction we must be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions to confirm and document that the site conditions do not materially differ from those interpreted conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

6. RISK LIMITATION

Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause an accidental release of those substances. In consideration of the provision of the services by us, which are for the Client's benefit, the Client agrees to hold harmless and to indemnify and defend us and our directors, officers, servants, agents, employees, workmen and contractors (hereinafter referred to as the "Company") from and against any and all claims, losses, damages, demands, disputes, liability and legal investigative costs of defence, whether for personal injury including death, or any other loss whatsoever, regardless of any action or omission on the part of the Company, that result from an accidental release of pollutants or hazardous substances occurring as a result of carrying out this Project. This indemnification shall extend to all Claims brought or threatened against the Company under any federal or provincial statute as a result of conducting work on this Project. In addition to the above indemnification, the Client further agrees not to bring any claims against the Company in connection with any of the aforementioned causes.

7. SERVICES OF SUBCONSULTANTS AND CONTRACTORS

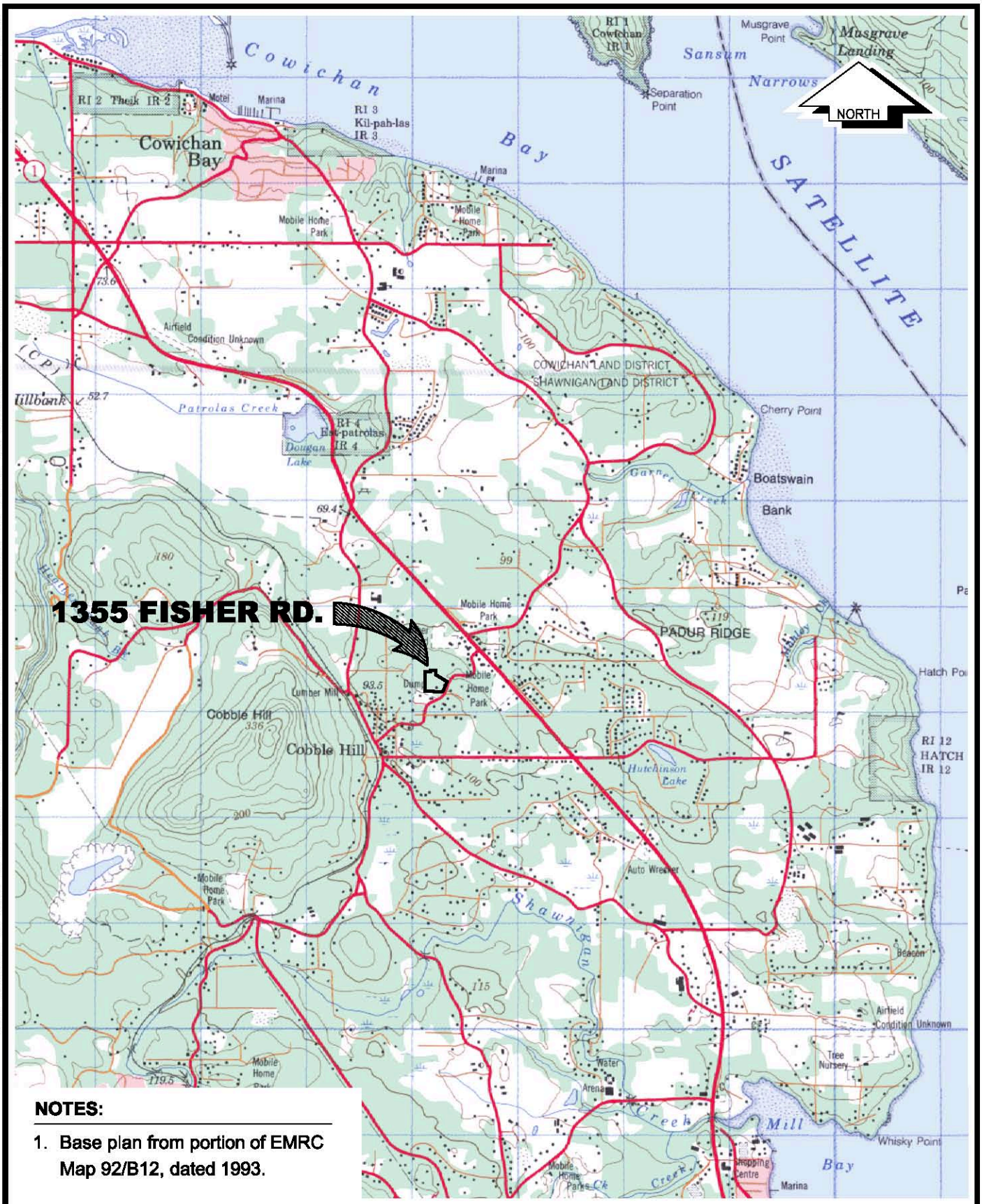
The conduct of engineering and environmental studies frequently requires hiring the services of individuals and companies with special expertise and/or services which we do not provide. We may arrange the hiring of these services as a convenience to our Clients. As these services are for the Client's benefit, the Client agrees to hold the Company harmless and to indemnify and defend us from and against all claims arising through such hirings to the extent that the Client would incur had he hired those services directly. This includes responsibility for payment for services rendered and pursuit of damages for errors, omissions or negligence by those parties in carrying out their work. In particular, these conditions apply to the use of drilling, excavation and laboratory testing services.

8. CONTROL OF WORK AND JOBSITE SAFETY

We are responsible only for the activities of our employees on the jobsite. The presence of our personnel on the site shall not be construed in any way to relieve the Client or any contractors on site from their responsibilities for site safety. The Client acknowledges that he, his representatives, contractors or others retain control of the site and that we never occupy a position of control of the site. The Client undertakes to inform us of all hazardous conditions, or other relevant conditions of which the Client is aware. The Client also recognizes that our activities may uncover previously unknown hazardous conditions or materials and that such a discovery may result in the necessity to undertake emergency procedures to protect our employees as well as the public at large and the environment in general. These procedures may well involve additional costs outside of any budgets previously agreed to. The Client agrees to pay us for any expenses incurred as the result of such discoveries and to compensate us through payment of additional fees and expenses for time spent by us to deal with the consequences of such discoveries. The Client also acknowledges that in some cases the discovery of hazardous conditions and materials will require that certain regulatory bodies be informed and the Client agrees that notification to such bodies by us will not be a cause of action or dispute.

9. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on our interpretation of conditions revealed through limited investigation conducted within a defined scope of services. We cannot accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or others who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.



NOTES:

1. Base plan from portion of EMRC Map 92/B12, dated 1993.

THIS DRAWING IS PART OF A THURBER 'REPORT' AND ITS USE IS SUBJECT TO THURBER'S STATEMENT OF GENERAL CONDITIONS

OCTOBER 18, 2011

DESIGNED PJW	COWICHAN VALLEY REGIONAL DISTRICT	
DRAWN RRS	GENERAL SITE LOCATION PLAN	THURBER
DATE JULY 11, 2011		
APPROVED BW	1355 FISHER ROAD WELL PRELIMNARY SITE INVESTIGATION — COBBLE HILL, B.C.	DWG. NO. 17-971-13-100
SCALE 1:50,000 Approx.		

TED03877.DWG

NORTH

GALLIERS ROAD

1425

1415

LOT 1

VACANT

GRAVEL EXTRACTION

INFERRED GROUNDWATER FLOW DIRECTON

LOT 1

1309

TRANS CANADA HIGHWAY

1310

1328

LOT 6

WELL

(Tag No. 102275)

VACANT

COMMERCIAL INDUSTRIAL

1345

1344

1340

1334

COMMERCIAL

INDUSTRIAL

1355

COMMERCIAL INDUSTRIAL

CHURCH

INFERRED GROUNDWATER FLOW DIRECTON

1357

1355

BALL ROAD

1356

1354

RESIDENTIAL

1375

FISHER ROAD

1360

1401

1395

GREEN HOUSES

RESIDENTIAL COMMERCIAL

1417

RESIDENTIAL

COMMERCIAL

1375

1397

1353

FAIRFIELD ROAD

NOTES:

1. Legal base plan provided by Kenyon Wilson, Land Surveyors.
2. Ortho-photo is portion of 2005 Airphoto CRD Line 9, RC-13 001.
3. Inferred Groundwater Flow Direction from Thurber Report dated May 16, 2011.

0 25 50 75 100 125 150m

SCALE 1:2500

DESIGNED	PJW
DRAWN	RRS
DATE	JULY 11, 2011
APPROVED	BW
SCALE	1:2500 Approx.

COWICHAN VALLEY REGIONAL DISTRICT

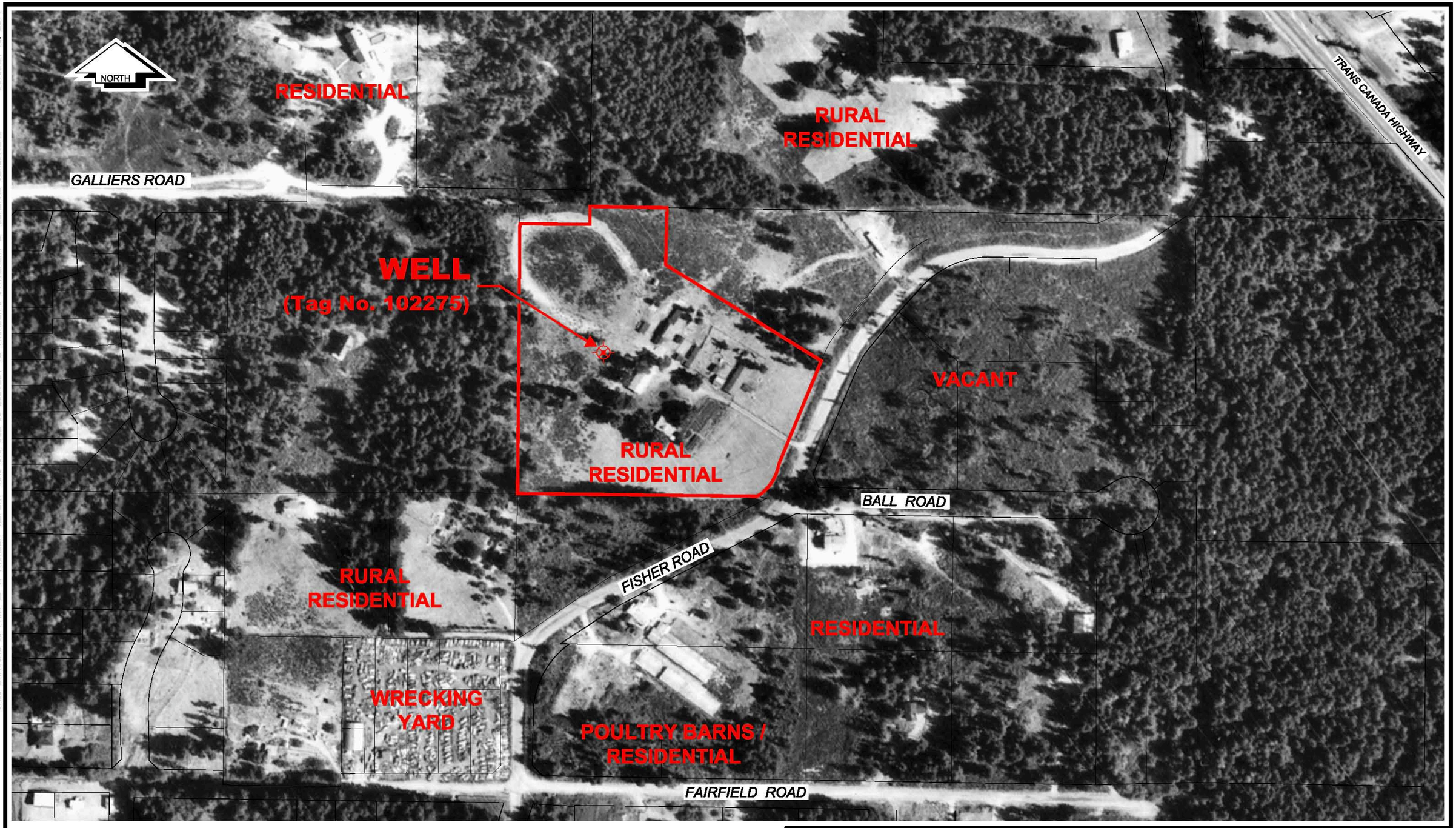
SURROUNDING LAND USAGE

1355 FISHER ROAD WELL
PRELIMNARY SITE INVESTIGATION

COBBLE HILL, B.C.

THURBER

DWG. NO.
17-971-13-101



NOTES:

1. Legal base plan provided by Kenyon Wilson, Land Surveyors.
2. Ortho-photo is portion of 1975 Airphoto BC7760 Frame #245.

0 25 50 75 100 125 150m
SCALE 1:2500

DESIGNED	PJW
DRAWN	RRS
DATE	JULY 11, 2011
APPROVED	BW
SCALE	1:2500 Approx.

COWICHAN VALLEY REGIONAL DISTRICT

SURROUNDING LAND USAGE (1975)

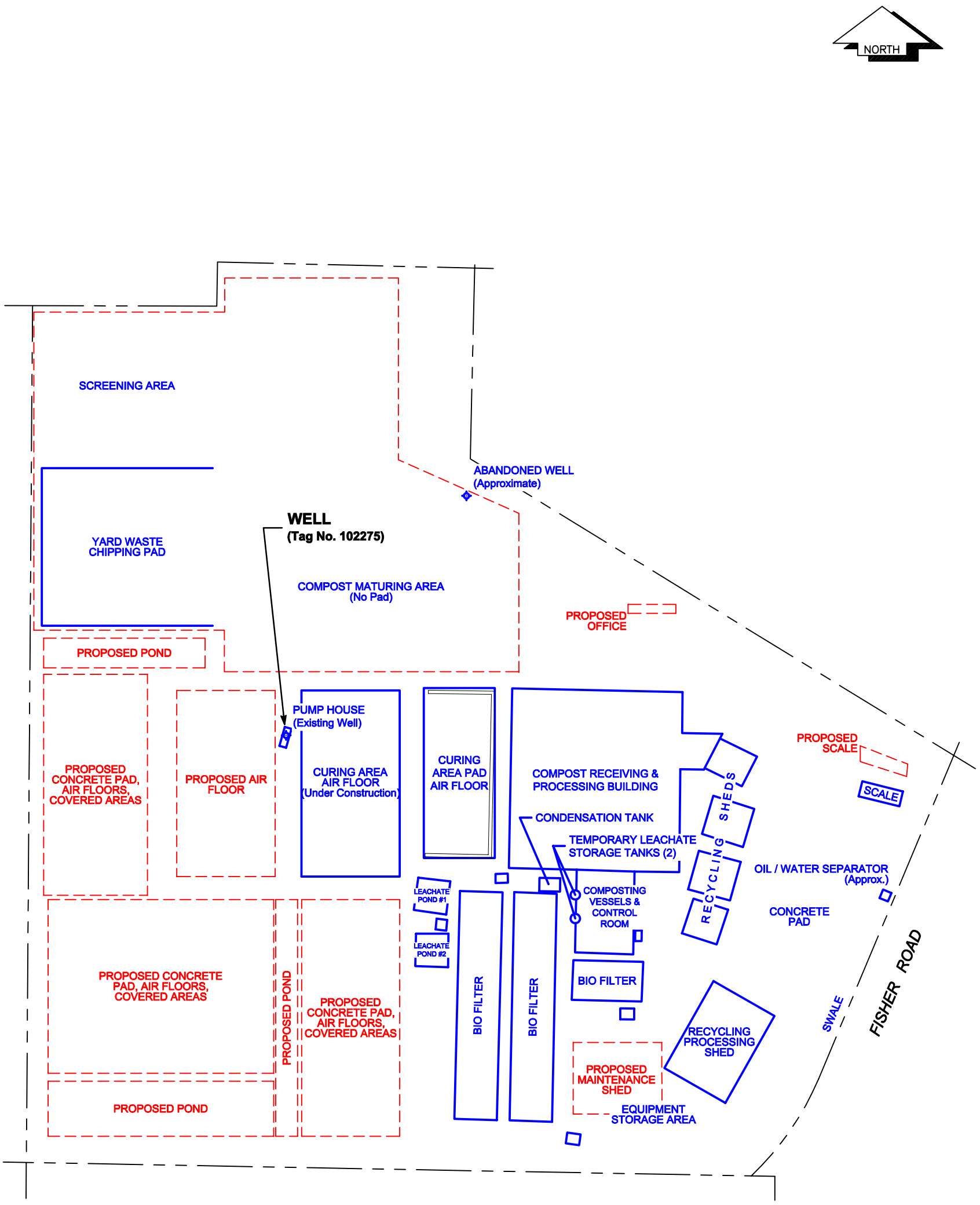
1355 FISHER ROAD WELL
PRELIMINARY SITE INVESTIGATION

COBBLE HILL, B.C.

THURBER

DWG. NO.
17-971-13-102

TED03877.DWG



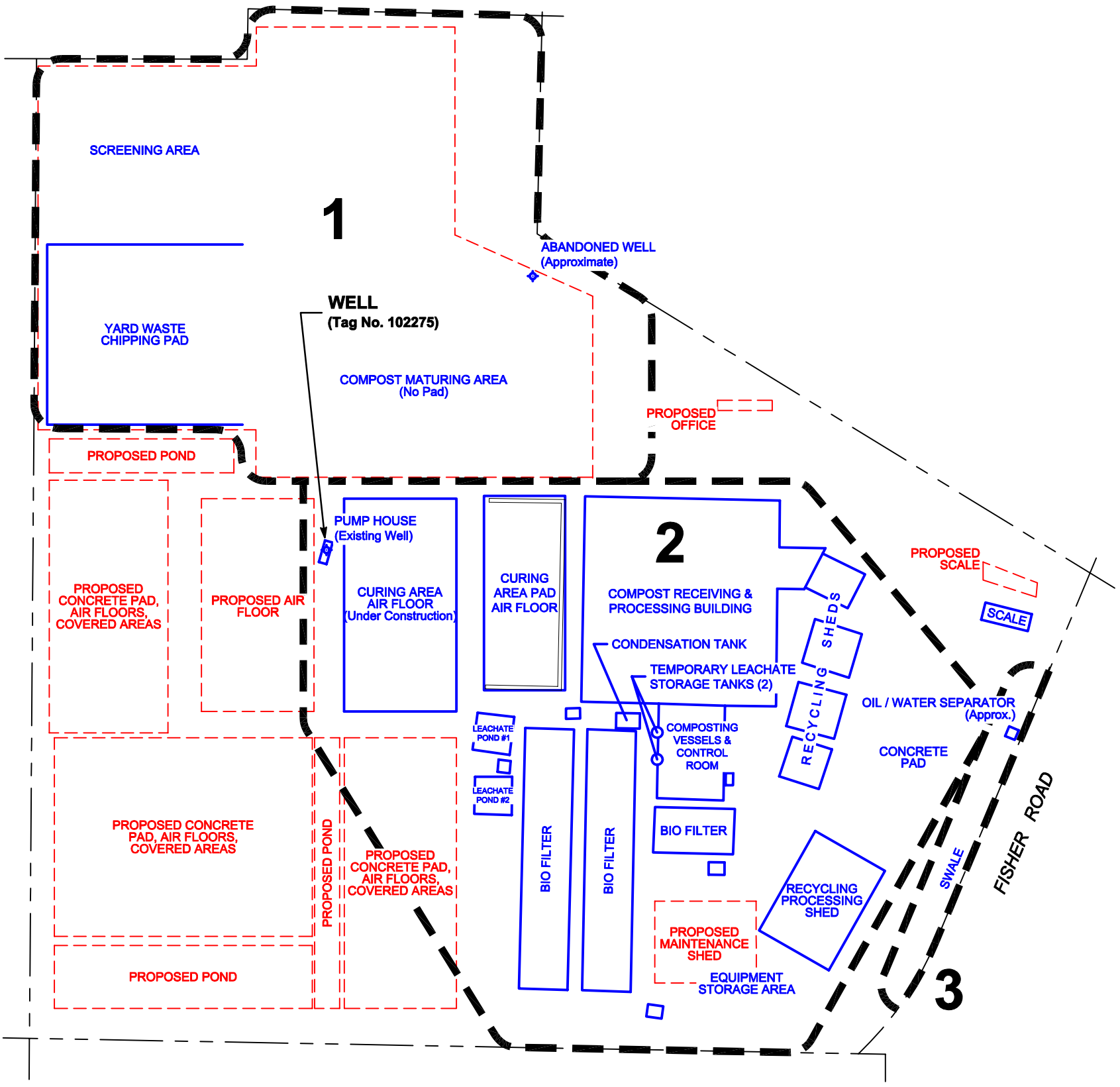
NOTES:

1. This plan is based on a plan provided to the C.V.R.D. by Fisher Road Recycling (date unknown) and includes existing and proposed development.
2. Plan interpretation and labels were modified after a site visit conducted by Thurber Engineering Ltd. (TEL) June, 2011.
3. BLUE indicates existing infrastructure where RED indicates proposed.

DESIGNED PJW	COWICHAN VALLEY REGIONAL DISTRICT	THURBER
DRAWN RRS	CURRENT SITE LAYOUT FISHER ROAD RECYCLING	
DATE JULY 11, 2011		
APPROVED BW	1355 FISHER ROAD WELL PRELIMNARY SITE INVESTIGATION COBBLE HILL, B.C.	
SCALE 1:1000 Approx.		DWG. NO. 17-971-13-103

APEC	PCOC
1	Metals, Ammonia, Nitrate
2	Metals, Ammonia, Nitrate, LEPH/HEPH, VPH & PAH
3	Metals, Ammonia, Nitrate, LEPH/HEPH, VPH, PAH & BTEX

1. See report text for additional information.
2. PCOC relate to CSR Controlled Subtanances.



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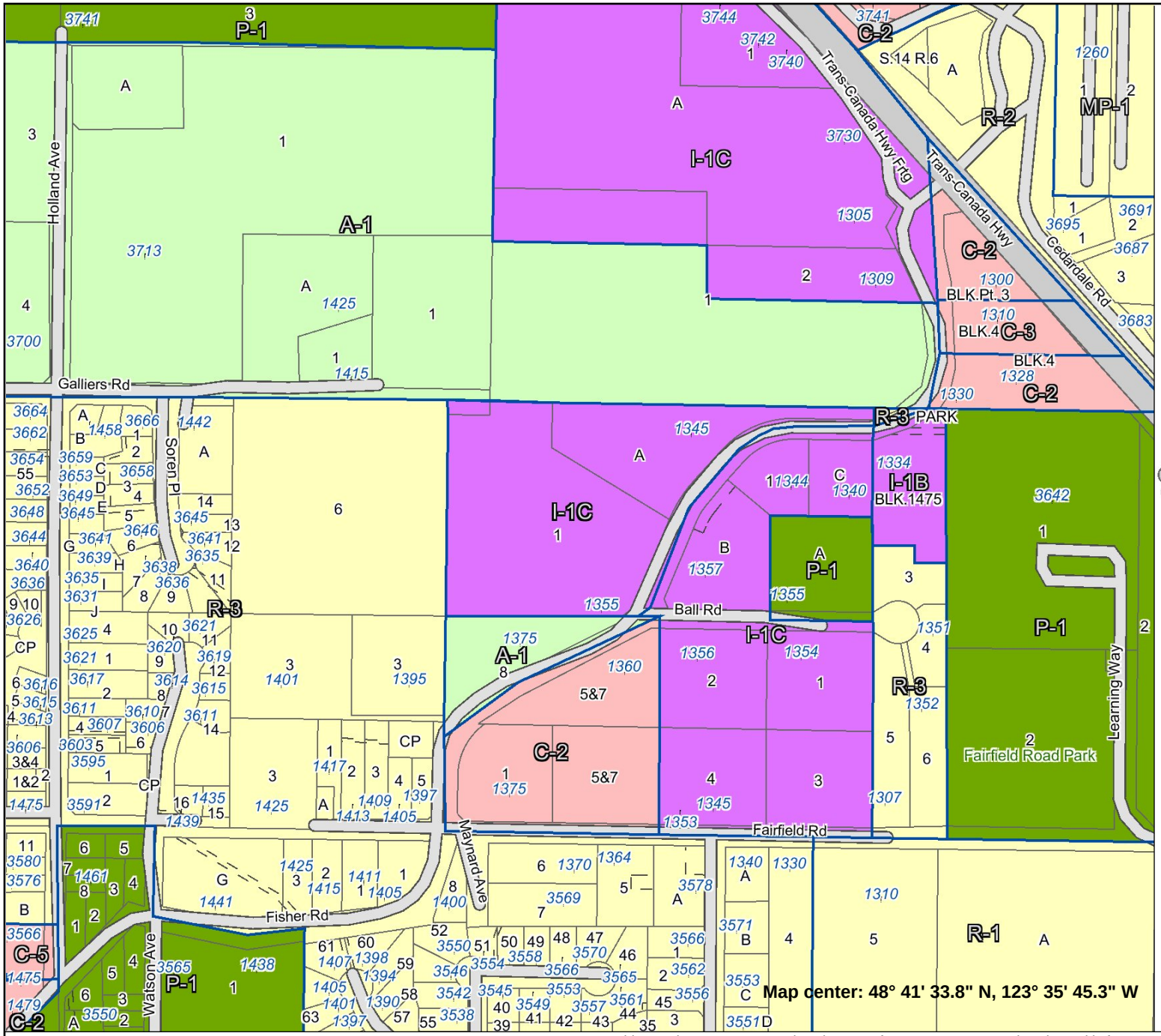
1. This plan is based on a plan provided to the C.V.R.D. by Fisher Road Recycling (date unknown) and includes existing and proposed development.
2. Plan interpretation and labels were modified after a site visit conducted by Thurber Engineering Ltd. (TEL) June, 2011.
3. BLUE indicates existing infrastructure where RED indicates proposed.

DESIGNED PJW	COWICHAN VALLEY REGIONAL DISTRICT	THURBER
DRAWN RRS	APEC & PCOC FISHER ROAD RECYCLING	
DATE JULY 11, 2011		
APPROVED PJW	1355 FISHER ROAD WELL PRELIMNARY SITE INVESTIGATION COBBLE HILL, B.C.	
SCALE 1:1000 Approx.		DWG. NO. 17-971-13-104



Cowichan Valley Regional District

The original Bylaws should be consulted for all purposes of interpretation and application of the Bylaws.

Legend

- Addresses
- Zoning Outline
- Roads
  - highway
  - Road
- Foreshore
- PARCEL_ARC
- BDEALNS
- BDRDLNS
- RDOTHNGZ
- Parcel Arcs
- First Nations
- Zoning Colour
  - AGRICULTURAL
  - COMMERCIAL
  - FIRST NATIONS
  - FORESTRY
  - INDUSTRIAL
  - ISLAND
  - NORTH COWICHAN
  - PARKS AND INSTITUTIONAL
  - RESIDENTIAL
  - TRANSPORTATION
  - UTILITY
  - WATER
- Parks by Community
  - PARKS
- Park Boundaries

Notes: Zoning

Date Printed: 7/06/2011 10:13:58

PLAN OF SUBDIVISION OF PART OF LOT 1, SECTION 13, RANGE 6, SHAWNIGAN DISTRICT, PLAN 29581

(BCGS 92B.063)

SCALE 1:1500 (All dimensions are in metres.)

THIS PLAN LIES WITHIN THE COWICHAN VALLEY REGIONAL DISTRICT

0 20 40 60 80 100 120 140

PLAN NO. VIP 51903

Deposited in the Land Title Office at Victoria, B.C.
this 4th day of Feb, 1991.

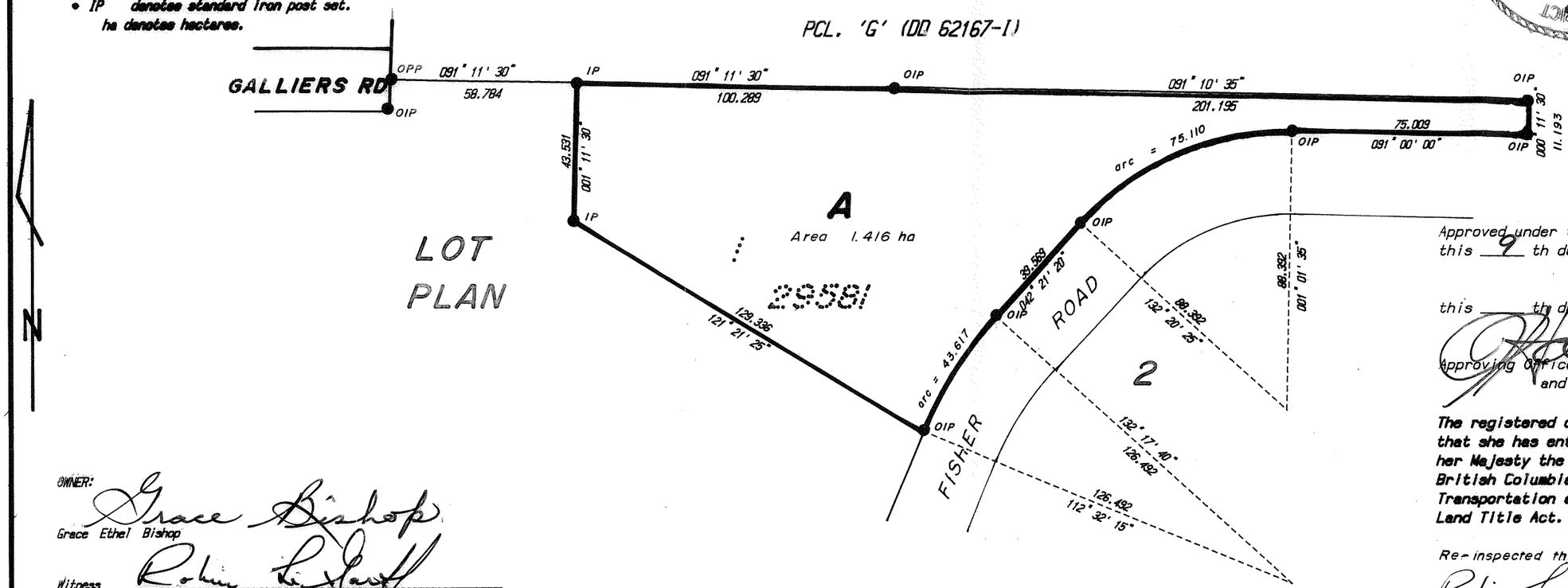
LAND TITLE OFFICE VICTORIA B.C. FEB 4 1991

Registrar

LEGEND:

- Bearings are astronomic, derived from Plan 29581
- OIP denotes standard iron post found.
- OPP denotes standard pipe-post found.
- IP denotes standard iron post set.

ha denotes hectares.



Approved under the Land Title Act
this 9th day of JAN, 1991

this ____ th day of ____, 1990

Approving Officer for the Ministry of Transportation and Highways

The registered owner designated hereon hereby declares that she has entered into a condition or covenant with her Majesty the Queen in right of the Province of British Columbia as represented by the Minister of Transportation and Highways under Section 215 of the Land Title Act.

Re-inspected this 20th day of December, 1990.
Robin LeGarff BCLS

I, Robin LeGarff, a British Columbia Land Surveyor of the Village of Shawnigan Lake, in British Columbia, certify that I was present at and personally superintended the survey represented by this plan, and that the plan and survey are correct.
The survey was completed on the 12th day of July, 1990.

Robin LeGarff B.C.L.S.

OWNER:
Grace Bishop
Grace Ethel Bishop

Witness Robin LeGarff
Address 2839 HARTH RD., RR 1 SHAWNIGAN LAKE B.C.
Occupation B.C.L.S.

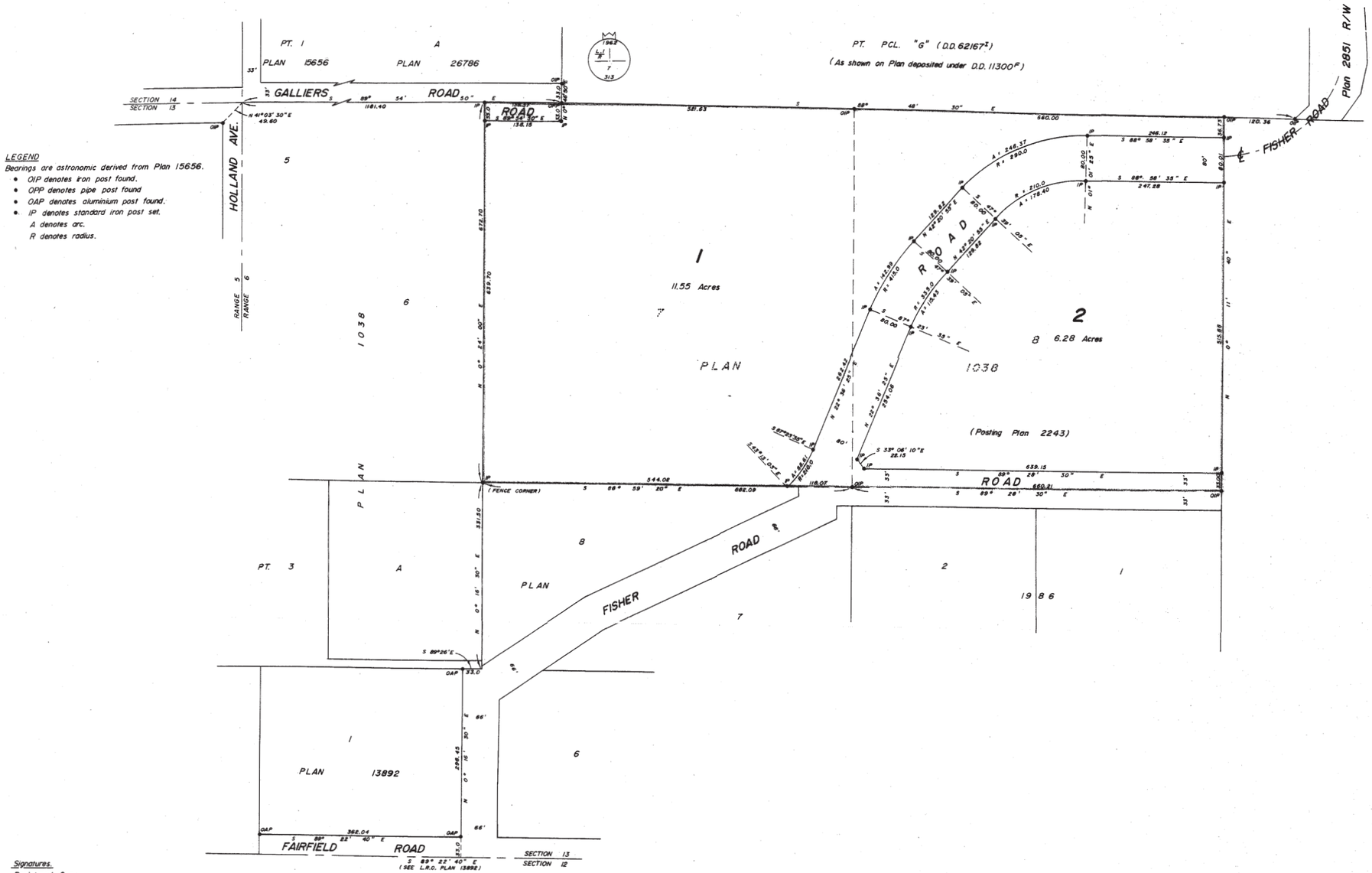
MORTGAGEE: ISLAND SAVINGS CREDIT UNION
(as to charge no. N 47497)
Authorised Signatory
Authorised Signatory
Witness K Beaveridge
Address 6184 Roome Rd - Duncan
Occupation Secretary

MORTGAGEE: Erna Edna Spek
(as to charge no. A 65824)
E. Ed. Spek
Witness L. Laban
Address 3737 Kingsburne Rd. Cobble Hill B.C.
Occupation Firefighter

PLAN OF SUBDIVISION OF LOTS 7 AND 8, PLAN 1038, SECTION 13, RANGE 6, SHAWNIGAN DISTRICT.

Scale : 1 inch = 100 feet.

PLAN 29581



LEGEND

Bearings are astronomic derived from Plan 15656.

- OIP denotes iron post found.
- OPP denotes pipe post found
- OAP denotes aluminium post found.
- IP denotes standard iron post set.

A denotes arc.
R denotes radius.

Deposited in the Land Registry Office at Victoria, B.C., this 9th day of JUNE, 1976.

E18645

Assistant Deputy Registrar.

Approved under the Land Registry Act this 14th day of MAY, 1976.

Approving Officer for the Department of Highways.

This plan lies within the Cowichan Valley Regional District

Signatures.

Registered Owner:

Grace E. Bishop
Grace Ethel Bishop

Witness as to signature.

Occupation

715 Canada Avenue
Address

Duncan B.C.

Mortgagee:
As to charge M A65824

E. E. Spek
Erno Edgar Spek

Witness as to signature.

Occupation

Duncan B.C.
Address

REDUCED

I, N. Roger Parry, of the City of Duncan, British Columbia Land Surveyor, make oath and say that I was present at and did personally superintend the survey represented by this plan, and that the survey and plan are correct. The said survey was completed on the 2nd day of April, 1976.

Sworn before me this 9th day of April 1976.

B.C.L.S.

A Commissioner for taking Affidavits within the Province of British Columbia.

- Search by PID 001-377-892:
  - 001-377-892 S/29581/////1 REM
    - PENDING APPLICATIONS:NONE
    - ○ FA30374 VI REGISTERED FISHER ROAD HOLDINGS LTD.
    - ◉ EP44484 VI CANCELLED WESTCOAST LANDFILL DIVERSION CORP.
    - ○ EP35377 VI CANCELLED 571873 B.C. LTD.
    - ○ EN68820 VI CANCELLED WESTCOAST LANDFILL DIVERSION CORP.
    - ○ EH56344 VI CANCELLED PACIFIC BEACH INVESTMENTS LTD
    - ○ EE9030 VI CANCELLED BISHOP, GRACE ETHEL
    - ○ E54923 VI CANCELLED BISHOP, GRACE ETHEL

Date: 02-Jun-2011 TITLE SEARCH PRINT Time: 08:55:07
Requestor: (PA58053) BURNS REGISTRY SERVICES LTD. Page 001 of 002
Folio: TITLE - FA30374

VICTORIA LAND TITLE OFFICE TITLE NO: FA30374
FROM TITLE NO: EP44484

APPLICATION FOR REGISTRATION RECEIVED ON: 10 MARCH, 2006
ENTERED: 14 MARCH, 2006

REGISTERED OWNER IN FEE SIMPLE:
FISHER ROAD HOLDINGS LTD., INC.NO. 0750952
4140 GORDON HEAD ROAD
VICTORIA, BC
V8N 3Y1

TAXATION AUTHORITY:
NANAIMO/COWICHAN ASSESSMENT AREA
COBBLE HILL IMPROVEMENT DISTRICT

DESCRIPTION OF LAND:
PARCEL IDENTIFIER: 001-377-892
LOT 1, SECTION 13, RANGE 6, SHAWNIGAN DISTRICT, PLAN 29581
EXCEPT PLAN VIP51903.

LEGAL NOTATIONS:

THIS TITLE MAY BE AFFECTED BY A PERMIT UNDER PART 26 OF THE LOCAL GOVERNMENT ACT, SEE FA79184

CHARGES, LIENS AND INTERESTS:
NATURE OF CHARGE
CHARGE NUMBER DATE TIME

EXCEPTIONS AND RESERVATIONS
M76300
REGISTERED OWNER OF CHARGE:
ESQUIMALT AND NANAIMO RAILWAY COMPANY
M76300
REMARKS: AFB 9.693.7434A, 206664G, SECTION 172(3)
FOR ACTUAL DATE AND TIME OF REGISTRATION SEE
ORIGINAL GRANT FROM E & N RAILWAY COMPANY

COVENANT
EE9026 1991-02-04 09:37
REGISTERED OWNER OF CHARGE:
HER MAJESTY THE QUEEN IN RIGHT OF THE PROVINCE OF BRITISH COLUMBIA
EE9026
REMARKS: PART, SECTION 215, LTA

EASEMENT
EE9031 1991-02-04 09:38
REMARKS: PART EXCEPT PLAN VIP51903 SHOWN INCLUDED
IN PLAN VIP51904.
APPURTENANT TO LOT A, PLAN VIP51903.

MORTGAGE
FA110123 2006-09-12 13:44
REGISTERED OWNER OF CHARGE:

Date: 02-Jun-2011 TITLE SEARCH PRINT Time: 08:55:07
Requestor: (PA58053) BURNS REGISTRY SERVICES LTD. Page 002 of 002
Folio: TITLE - FA30374

JANE ANN LAING
JAMES ARTHUR LAING
AS JOINT TENANTS
FB402307
REMARKS: MODIFIED BY FB402308

MODIFICATION
FB402308 2011-03-01 10:15
REMARKS: MODIFICATION OF FA110123

MORTGAGE
FB402309 2011-03-01 10:15
REGISTERED OWNER OF CHARGE:
DR. JAMES A. LAING INC.
INCORPORATION NO. 331294
ROCHE COVE INVESTMENTS INC.
INCORPORATION NO. 584168
D.L. BINS LTD.
INCORPORATION NO. 602861
DAVID JAMES LAING
FB402309

"CAUTION - CHARGES MAY NOT APPEAR IN ORDER OF PRIORITY. SEE SECTION 28, L.T.A."

DUPLICATE INDEFEASIBLE TITLE: NONE OUTSTANDING

TRANSFERS: NONE

PENDING APPLICATIONS: NONE

*** CURRENT INFORMATION ONLY - NO CANCELLED INFORMATION SHOWN ***

Date: 12-Jul-2011 TITLE SEARCH PRINT Time: 16:10:30
Requestor: (PA82813) THURBER MANAGEMENT LTD. Page 001 of 003
Folio: TITLE - EP44484

VICTORIA LAND TITLE OFFICE TITLE NO: EP44484
FROM TITLE NO: EP35377

APPLICATION FOR REGISTRATION RECEIVED ON: 06 JUNE, 2000
ENTERED: 08 JUNE, 2000
TITLE CANCELLED: 14 MARCH, 2006

REGISTERED OWNER IN FEE SIMPLE:
WESTCOAST LANDFILL DIVERSION CORP., INC.NO. 597427
1355 FISHER ROAD
COBBLE HILL, BC
V0R 1L0

TAXATION AUTHORITY:
NANAIMO/COWICHAN ASSESSMENT AREA
COBBLE HILL IMPROVEMENT DISTRICT

DESCRIPTION OF LAND:
PARCEL IDENTIFIER: 001-377-892
LOT 1, SECTION 13, RANGE 6, SHAWNIGAN DISTRICT, PLAN 29581
EXCEPT PLAN VIP51903.

LEGAL NOTATIONS:

BYLAW CONTRAVENTION NOTICE, LOCAL GOVERNMENT ACT, SECTION 700
SEE ET42353

CHARGES, LIENS AND INTERESTS:
NATURE OF CHARGE
CHARGE NUMBER DATE TIME

EXCEPTIONS AND RESERVATIONS
M76300
REGISTERED OWNER OF CHARGE:
ESQUIMALT AND NANAIMO RAILWAY COMPANY
M76300
REMARKS: AFB 9.693.7434A, 206664G, SECTION 172(3)
FOR ACTUAL DATE AND TIME OF REGISTRATION SEE
ORIGINAL GRANT FROM E & N RAILWAY COMPANY

COVENANT
EE9026 1991-02-04 09:37
REGISTERED OWNER OF CHARGE:
HER MAJESTY THE QUEEN IN RIGHT OF THE PROVINCE OF BRITISH COLUMBIA
EE9026
REMARKS: PART, SECTION 215, LTA

EASEMENT
EE9031 1991-02-04 09:38
REMARKS: PART EXCEPT PLAN VIP51903 SHOWN INCLUDED
IN PLAN VIP51904.
APPURTENANT TO LOT A, PLAN VIP51903.

MORTGAGE
EP44485 2000-06-06 11:44

Date: 12-Jul-2011 TITLE SEARCH PRINT Time: 16:10:30
Requestor: (PA82813) THURBER MANAGEMENT LTD. Page 002 of 003
Folio: TITLE - EP44484

REGISTERED OWNER OF CHARGE:
BUSINESS DEVELOPMENT BANK OF CANADA
EP44485

MORTGAGE
EP44486 2000-06-06 11:44
REGISTERED OWNER OF CHARGE:
THE TORONTO-DOMINION BANK
EP44486

MORTGAGE
EV4421 2003-01-15 10:42
REGISTERED OWNER OF CHARGE:
HUWS CORPORATION
EV4421

JUDGMENT
EV18271 2003-02-24 14:13
REGISTERED OWNER OF CHARGE:
PHILIP BANTON
EV18271
REMARKS: RENEWED BY EX10375

JUDGMENT
EV104908 2003-09-08 14:14
REGISTERED OWNER OF CHARGE:
PATRICK G. GUY, LAW CORPORATION
EV104908
REMARKS: RENEWED BY EX113013

JUDGMENT
EX10375 2005-01-28 15:13
REGISTERED OWNER OF CHARGE:
PHILIP BANTON
EX10375
REMARKS: RENEWAL OF EV18271

JUDGMENT
EX113013 2005-09-06 10:26
REGISTERED OWNER OF CHARGE:
PATRICK G. GUY, LAW CORPORATION
EX113013
REMARKS: RENEWAL OF EV104908

JUDGMENT
EX116795 2005-09-14 09:24
REGISTERED OWNER OF CHARGE:
PHILIP BANTON
EX116795

"CAUTION - CHARGES MAY NOT APPEAR IN ORDER OF PRIORITY. SEE SECTION 28, L.T.A."

DUPLICATE INDEFEASIBLE TITLE: NONE OUTSTANDING

TRANSFERS:
2006-03-14 NO TITLE

Date: 12-Jul-2011 TITLE SEARCH PRINT Time: 16:10:30
Requestor: (PA82813) THURBER MANAGEMENT LTD. Page 003 of 003
Folio: TITLE - EP44484

ALL.....FA30374

*** CURRENT INFORMATION ONLY - NO CANCELLED INFORMATION SHOWN ***

Date: 02-Jun-2011 TITLE SEARCH PRINT Time: 08:55:47
Requestor: (PA58053) BURNS REGISTRY SERVICES LTD. Page 001 of 002
Folio: TITLE - E54923

VICTORIA LAND TITLE OFFICE TITLE NO: E54923
FROM TITLE NO: E18645

APPLICATION FOR REGISTRATION RECEIVED ON: 08 JUNE, 1976
ENTERED: 10 JUNE, 1976
TITLE CANCELLED: 14 FEBRUARY, 1991

REGISTERED OWNER IN FEE SIMPLE:
GRACE ETHEL BISHOP, HOUSEWIFE,
BOX 305, FISHER ROAD, RR #2,
COBBLE HILL, B. C.

TAXATION AUTHORITY:
NANAIMO/COWICHAN ASSESSMENT AREA

DESCRIPTION OF LAND:
PARCEL IDENTIFIER: 001-377-892
LOT 1, SECTION 13, RANGE 6, SHAWNIGAN DISTRICT, PLAN 29581

LEGAL NOTATIONS: NONE

CHARGES, LIENS AND INTERESTS:
NATURE OF CHARGE
CHARGE NUMBER DATE TIME

EXCEPTIONS AND RESERVATIONS
M76300
REGISTERED OWNER OF CHARGE:
ESQUIMALT AND NANAIMO RAILWAY COMPANY
M76300
REMARKS: AFB 9.693.7434A 206664G SECTION 172(3)

MORTGAGE
A65824 1972-08-29 00:00
REGISTERED OWNER OF CHARGE:
ERNA EDNA SPEK
A65824

MORTGAGE
ED61821 1990-06-01 12:38
REGISTERED OWNER OF CHARGE:
ISLAND SAVINGS CREDIT UNION
ED61821

ASSIGNMENT OF RENTS
ED61822 1990-06-01 12:38
REGISTERED OWNER OF CHARGE:
ISLAND SAVINGS CREDIT UNION
ED61822
REMARKS: DD ED61821

COVENANT
EE9026 1991-02-04 09:37
REGISTERED OWNER OF CHARGE:
HER MAJESTY THE QUEEN IN RIGHT OF THE PROVINCE OF BRITISH COLUMBIA

Date: 02-Jun-2011 TITLE SEARCH PRINT Time: 08:55:47
Requestor: (PA58053) BURNS REGISTRY SERVICES LTD. Page 002 of 002
Folio: TITLE - E54923

EE9026
REMARKS: PART.
PURSUANT TO SECTION 215 LAND TITLE ACT.

PRIORITY AGREEMENT
EE9027 1991-02-04 09:37
REMARKS: GRANTING EE9026 PRIORITY OVER
ED61821 AND ED61822.

PRIORITY AGREEMENT
EE9028 1991-02-04 09:37
REMARKS: GRANTING EE9026 PRIORITY OVER A65824.

EASEMENT
EE9031 1991-02-04 09:38
REMARKS: PART EXCEPT PLAN VIP51903 SHOWN INCLUDED
IN PLAN VIP51904.
APPURTENANT TO LOT A, PLAN VIP51903.

"CAUTION - CHARGES MAY NOT APPEAR IN ORDER OF PRIORITY. SEE SECTION 28, L.T.A."

DUPLICATE INDEFEASIBLE TITLE: NONE OUTSTANDING

TRANSFERS:
1991-02-14
PART SUB PLAN VIP51903.....EE9029
1991-02-14
REM.....EE9030

*** CURRENT INFORMATION ONLY - NO CANCELLED INFORMATION SHOWN ***

THE GOVERNMENT OF THE PROVINCE OF BRITISH COLUMBIA

LAND REGISTRY ACT
(FORM F, SECTION 143)

Title No. E 1 8 6 4 5

Register Vol.

From Title No. 388694-I
75150-W
A65823

CERTIFICATE OF INDEFEASIBLE TITLE

Land Registry Office, Victoria, British Columbia.

This is to certify that the undermentioned registered owner in fee-simple is absolutely and indefeasibly entitled in fee-simple, subject to such charges, liens, and interests as are notified by endorsement hereon, and subject to the conditions, exceptions, and reservations set out hereon, to the land situated in the Province of British Columbia, and more particularly described below.

Registered owner in fee-simple: Application for registration received 16th January 1976

GRACE ETHEL BISHOP, Housewife,

Box 305, Fisher Road, R.R. #2,

Cobble Hill, B. C.

Description of land: (*See* back hereof for transfers (if any) of the land or a part thereof). (Cowichan Assessment District)

Lots 7 and 8, Section 13, Range 6, Shawnigan District, Plan 1038

This Certificate of Title may be affected by The Land Commission Act; see Agricultural Land Reserve Plan No. 2, Deposited 27.5.74, H. T. Kennedy, Registrar per: CL

CANCELLED
8 6 -1 76
654923

CHARGES, LIENS, AND INTERESTS*

Nature of Charge; Number; Date and Time of Application	Registered Owner of Charge	Remarks
Exceptions and Reservations 206664-G	Esquimalt and Nanaimo Railway Company	
M A65824 29.8.72	Erna Edna Spek	

In witness whereof I have hereunto set my hand and the seal of my office aforesaid, this 19th day of

2 LAST PAGE

This certificate of indefeasible title is void as against the title of any person adversely in actual possession of and rightly entitled to the land included in same at the time of the application upon which this certificate was granted, and who continues in possession, and is subject to

(*a*) the subsisting exceptions or reservations contained in the original grant from the Crown;
(*b*) any Dominion or Provincial tax, rate, or assessment at the date of the application for registration imposed or made a lien or which may thereafter be imposed or made a lien on the land;
(*c*) any municipal charge, rate, or assessment at the date of the application for registration imposed or which may thereafter be imposed on the land, or which had theretofore been imposed for local improvements or otherwise and which was not then due and payable, including any charge, rate, or assessment imposed by any public corporate body having taxing powers over an area in which the land is situate;
(*d*) any lease, or agreement for lease, for a period not exceeding three years, where there is actual occupation under the same;
(*e*) any public highway or right-of-way, watercourse or right of water, or other public easement;
(*f*) any right of expropriation by Statute;
(*g*) any lis pendens or mechanics' lien, judgment, caveat, or other charge, or any assignment for the benefit of creditors or receiving order or assignment under the *Bankruptcy Act*, registered since the date of the application for registration;
(*h*) any condition, exception, reservation, charge, lien, or interest noted or endorsed hereon;
(*i*) the right of any person to show that the whole or any portion of the land is by wrong description of boundaries or parcels improperly included in this certificate;
(*j*) the right of any person to show fraud, wherein the registered owner or wherein the person from or through whom the registered owner derived his right or title otherwise than bona fide for value has participated in any degree;
(*k*) any restrictive condition, right of reverter, or obligation imposed on the land by the *Forest Act* when noted and endorsed hereon.

THIS CERTIFICATE MAY BE AFFECTED BY THE LAND ACT AMENDMENT ACT, 1961 (*see* S.B.C. 1970, Chapter 17).

The following parcels have been transferred:— Strata Lot 4 Plan 29581 (ALL)

Land	To Certificate No.

ABBREVIATIONS:

CML=Claim of mechanics' lien.	LP =Lis pendens.	RP =Right to purchase.
CVT =Caveat.	M =Mortgage.	RW =Right-of-way.
E =Easement.	OP =Option to purchase.	SRP =Sub-right to purchase.
J =Judgment.	RC =Restrictive covenant.	TSN=Tax Sale Notice.
L =Lease.	RFR=Right of first refusal.	U =Undersurface rights.

Title No. A 6 5 8 2 3

ONE PAGE ONLY

Register Vol.

From Title No. 388694-I

LAND REGISTRY ACT
(FORM F, SECTION 143)

CERTIFICATE OF INDEFEASIBLE TITLE

Land Registry Office, Victoria, British Columbia.

This is to certify that the undermentioned registered owner in fee-simple is absolutely and indefeasibly entitled in fee-simple, subject to such charges, liens, and interests as are notified by endorsement hereon, and subject to the conditions, exceptions, and reservations set out hereon, to the land situated in the Province of British Columbia, and more particularly described below.

Registered owner in fee-simple: Application for registration received 29th, August, 1972

GRACE ETHEL THOMPSON, Housewife,
Fisher Road,
Cobble Hill, B. C.

Description of land: (*See* back hereof for transfers (if any) of the land or a part thereof). (Cowichan Assessment District and Mill Bay F.P.D.
An undivided 1/2 interest in Lots 7 and 8, Section 13, Range 6, Shawnigan District, Plan 1038

THIS CERTIFICATE OF TITLE MAY BE AFFECTED BY THE LAND COMMISSION ACT.

CANCELLED Jan 16 1976 E18645

CHARGES, LIENS, AND INTERESTS*

Nature of Charge; Number; Date and Time of Application	Registered Owner of Charge	Remarks
Exceptions and Reservations 206664-G	Esquimalt and Nanaimo Railway Company	
M 333508-G 15.11.66 3.14	Adam Wolf and Barbara Wolf as Joint Tenants	cancelled A-74557 5.9.72 H.T. Kennedy per Cms
M A65824 29.8.72	Erna Edna Spek	Undivided 1/2 interest i.a.
CML.B19153 22.3.73	Bayview Builders Supplies (1972) Ltd.	Cancelled C48843 29/3/74 H.T. Kennedy Reg.

In witness whereof I have hereunto set my hand and the seal of my office aforesaid, this 29th day of August, 19 72.

Deputy Registrar.

* Each endorsement affects all the land described herein, unless otherwise indicated in "Remarks" column. *See* back hereof for abbreviations, etc.

rhs

388694

From Certificate No. 373324-I

No. 388694-I

THE GOVERNMENT OF THE PROVINCE OF BRITISH COLUMBIA

Register, Vol. 1541

LAND REGISTRY ACT
FORM F (Section 143)

Certificate of Indefeasible Title

Date of application for registration, the 15th day of November, 19 66

This is to certify that GARY GILBERT THOMPSON and GRACE ETHEL THOMPSON, 4277 Glanford Avenue, Victoria, B.C., as JOINT TENANTS as to an undivided one-half (½) interest and KEITH ALBERT THOMPSON, c/o Mrs. Tom Crookes, Cardston, Alberta, as to an undivided one-half (½) interest

are *absolutely and indefeasibly entitled in fee-simple, subject to such charges, liens, and interests as are notified by endorsement hereon, and subject to the conditions, exceptions, and reservations set out hereon, to* those

*piece*s *of land situate in the* Cowichan Assessment District and Koksilah Valley Hospital Improvement District No. 19 and Mill Bay F.P.D.

and Province of British Columbia, and more particularly known and described as:—

Lots	7 and 8
Section	13
Range	6
District	Shawnigan
Plan	1038

THIS CERTIFICATE OF TITLE MAY BE AFFECTED BY THE LAND COMMISSION ACT.

This certificate of indefeasible title is void as against the title of any person adversely in actual possession of and rightly entitled to the land included in same at the time of the application upon which this certificate was granted, and who continues in possession, and is subject to—

(a) The subsisting exceptions or reservations contained in the original grant from the Crown:
(b) Any Dominion or Provincial tax, rate, or assessment at the date of the application for registration imposed or made a lien or which may thereafter be imposed or made a lien on the land:
(c) Any municipal charge, rate, or assessment at the date of the application for registration imposed or which may thereafter be imposed on the land, or which had theretofore been imposed for local improvements or otherwise and which was not then due and payable, including any charge, rate, or assessment imposed by any public corporate body having taxing powers over an area in which the land is situate:
(d) Any lease, or agreement for lease, for a period not exceeding three years, where there is actual occupation under the same:
(e) Any public highway or right-of-way, watercourse, or right of water, or other public easement:
(f) Any right of expropriation by Statute:
(g) Any lis pendens or mechanics' lien, judgment, caveat, or other charge, or any assignment for the benefit of creditors or receiving order or authorized assignment under the *Bankruptcy Act*, registered since the date of the application for registration:
(h) Any condition, exception, reservation, charge, lien, or interest noted or endorsed thereon:
(i) The right of any person to show that the whole or any portion of the land is by wrong description of boundaries or parcels improperly included in this certificate:
(j) The right of any person to show fraud, wherein the registered owner or wherein the person from or through whom the registered owner derived his right or title otherwise than *bona fide* for value has participated in any degree:
(k) Any restrictive condition, right of reverter, or obligation imposed on the land by the *Forest Act* when noted and endorsed thereon.

THIS CERTIFICATE MAY BE AFFECTED BY THE LAND ACT AMENDMENT ACT, 1961.

THE FOLLOWING PIECES OF LAND HAVE BEEN TRANSFERRED

LAND	CERT. NO.
Undivided ½ interest of G.G. Thompson	75150F
Undivided ½ interest of K.A. Thompson	A65823

CANCELLED
Jan 17 1967
E18645
By

Form "G" Land Registry Act (Sec. 50)
MEMORA[illegible] TION
Register[illegible]
[illegible]
[illegible]

In witness wherenf *I have hereunto set my hand and seal of office*

at Victoria, *British Columbia,*

this 22 *day of* December

19 66

H. C. [illegible]
Registrar.

[OVER]

ABBREVIATIONS:
M.= Mortgage in fee.
R.P.= Right to purchase.
S.R.P.= Sub-right to purchase.
L.P.= Lis pendens.
L.= Lease.
R.C.= Restrictive covenant.

FOR OTHER ABBREVIATIONS FILL IN HERE.

R—EXCEPTIONS AND RESERVATIONS CO IN THE ORIGINAL GRANT FROM TH ALT AND NANAIMO RAILWAY C

CHARGES, LIENS, AND INTERESTS

LAND	Nature of Charge	No.	Date of Application	Time	OWNER OF CHARGE	Value or Amount	PARTICULARS, TERM, RATE, ETC.	RELEASES No.	RELEASES Date	Registrar's Signature to Releases
All	R	206664-G			ESQUIMALT AND NANAIMO RAILWAY COMPANY					
All	M	333508-G	15.11.66	3:14	Adam Wolf and Barbara Wolf as Joint Tenants			A-74557	5.9.72	H.T. Kennedy per Cmo
All	L.P.	407957	13.11.70	3:26	Grace Ethel Thompson (Plaintiff)		Gary Gilbert Thompson and Keith Albert Thompson (Defendants)	185069 P	30.6.71	H.T. Kennedy
Ind. 3/4 int. i.a.	L.P.	421861-G	5.7.71	3:57	Grace Ethel Thompson (Plaintiff)		Gary Gilbert Thompson and Keith Albert Thompson (Defendants)	A65822	29.8.72	H.T. Kennedy
Ind. 1/4 int. i.a.	M	A65824	29.8.72		Irene Edna Speck					
Ind. 1/4 int. i.a.	CHL	B19153	22.3.72		Bayview Builders Supplies (1972) Ltd.			CH8843	29.3.74	H.T. Kennedy

THE GOVERNMENT OF THE PROVINCE OF BRITISH COLUMBIA

ONE PAGE ONLY

Title No. 75150-W

Register Vol.

From Title No. 388694-I

LAND REGISTRY ACT
(FORM F, SECTION 143)

CERTIFICATE OF INDEFEASIBLE TITLE

Land Registry Office, Victoria, British Columbia.

This is to certify that the undermentioned registered owner in fee-simple is absolutely and indefeasibly entitled in fee-simple, subject to such charges, liens, and interests as are notified by endorsement hereon, and subject to the conditions, exceptions, and reservations set out hereon, to the land situated in the Province of British Columbia, and more particularly described below.

Registered owner in fee-simple: Application for registration received 27th May 1971

GRACE ETHEL THOMPSON, Housewife,

3190 Martindale Road,

Victoria, B.C.

Description of land: (*See* back hereof for transfers (if any) of the land or a part thereof). (Cowichan Assessment District)

M.I. Bay F.P.D.

Undivided ¼ interest in Lots 7 and 8, Section 13, Range 6, Shawnigan District, Plan 1038

THIS CERTIFICATE OF TITLE MAY BE AFFECTED BY THE LAND COMMISSION ACT.

CANCELLED Jan 16 1976 E18645 Per mtm

CHARGES, LIENS, AND INTERESTS*

Nature of Charge; Number; Date and Time of Application	Registered Owner of Charge	Remarks
Exceptions and Reservations 206664-G	Esquimalt and Nanaimo Railway Company	
M 333508-G 15.11.66 3.14	Adam Wolf and Barbara Wolf as Joint Tenants.	cancelled A-74557 5.9.72 H.T Kennedy per CMO
L.P. 421861-G 5/7/71 3.57	Grace Ethel Thompson (Plaintiff)	Gary Gilbert Thompson and Keith Albert Thompson (Defendants) all i.a. cancelled A65822 29.8.72 H.T Kennedy per [illegible]
M A65824 29.8.72	Erna Edna [illegible]	Und 1/4 int i.a.
CML E19153 22.3.73	Bayview Builders Supplies (1972) Ltd.	Cancelled C48843 29/3/74 H.T. Kennedy [illegible]

In witness whereof I have hereunto set my hand and the seal of my office aforesaid, this 30th day of June 71

3733324

From Certificate No. 279236-I

No. 373324-I

Register. Vol. 1480

THE GOVERNMENT OF THE PROVINCE OF BRITISH COLUMBIA

LAND REGISTRY ACT
FORM F (Section 143)

Certificate of Indefeasible Title

Date of application for registration, the 12th day of January at 1.41 p.m., 1966

This is to certify that

OFFICIAL ADMINISTRATOR, COUNTY OF NANAIMO, NANAIMO, P.O. Box 129, Nanaimo, British Columbia, Administrator with the Will annexed of the Estate of Johannes Heinrich Umland (also known as John Umland), Deceased, D.F. 100872

is *absolutely and indefeasibly entitled in fee-simple, subject to such charges, liens, and interests as are notified by endorsement hereon, and subject to the conditions, exceptions, and reservations set out hereon, to* those

piece of land situate in the Cowichan Assessment District and Koksilah Valley Hospital Improvement District No. 19

and Province of British Columbia, and more particularly known and described as:—

Lots	Seven (7) and Eight (8)
Section	Thirteen (13)
Range	Six (6)
District	Shawnigan
Plan	1038

This certificate of indefeasible title is void as against the title of any person adversely in actual possession of and rightly entitled to the land included in same at the time of the application upon which this certificate was granted, and who continues in possession, and is subject to—

(a) The subsisting exceptions or reservations contained in the original grant from the Crown:

(b) Any Dominion or Provincial tax, rate, or assessment at the date of the application for registration imposed or made a lien or which may thereafter be imposed or made a lien on the land:

(c) Any municipal charge, rate, or assessment at the date of the application for registration imposed or which may thereafter be imposed on the land, or which had theretofore been imposed for local improvements or otherwise and which was not then due and payable, including any charge, rate, or assessment imposed by any public corporate body having taxing powers over an area in which the land is situate:

(d) Any lease, or agreement for lease, for a period not exceeding three years, where there is actual occupation under the same:

(e) Any public highway or right-of-way, watercourse, or right of water, or other public easement:

(f) Any right of expropriation by Statute:

(g) Any lis pendens or mechanics' lien, judgment, caveat, or other charge, or any assignment for the benefit of creditors or receiving order or authorized assignment under the *Bankruptcy Act*, registered since the date of the application for registration:

(h) Any condition, exception, reservation, charge, lien, or interest noted or endorsed thereon:

(i) The right of any person to show that the whole or any portion of the land is by wrong description of boundaries or parcels improperly included in this certificate:

(j) The right of any person to show fraud, wherein the registered owner or wherein the person from or through whom the registered owner derived his right or title otherwise than *bona fide* for value has participated in any degree:

(k) Any restrictive condition, right of reverter, or obligation imposed on the land by the *Forest Act* when noted and endorsed thereon.

THIS CERTIFICATE MAY BE AFFECTED BY THE LAND ACT AMENDMENT ACT, 1961.

THE FOLLOWING PIECES OF LAND HAVE BEEN TRANSFERRED	
LAND	CERT. No.
All	338694-I

CANCELLED
DEC 29 1966
J. V. DICKSON, Registrar
Per

In witness wherof *I have hereunto set my hand and seal of office*

at Victoria, *British Columbia,*

this 15 *day of* February

1966

This certificate of indefeasible title is void as against the title of any person adversely in actual possession of and rightly entitled to the land included in same at the time of the application upon which this certificate was granted, and who continues in possession, and is subject to—

(a) The subsisting exceptions or reservations contained in the original grant from the Crown:

(b) Any Dominion or Provincial tax, rate, or assessment at the date of the application for registration imposed or made a lien or which may thereafter be imposed or made a lien on the land:

(c) Any municipal charge, rate, or assessment at the date of the application for registration imposed or which may thereafter be imposed on the land, or which had theretofore been imposed for local improvements or otherwise and which was not then due and payable, including any charge, rate, or assessment imposed by any public corporate body having taxing powers over an area in which the land is situate:

(d) Any lease, or agreement for lease, for a period not exceeding three years, where there is actual occupation under the same:

(e) Any public highway or right-of-way, watercourse, or right of water, or other public easement:

(f) Any right of expropriation by Statute:

(g) Any lis pendens or mechanics' lien, judgment, caveat, or other charge, or any assignment for the benefit of creditors or receiving order or authorized assignment under the "Bankruptcy Act," registered since the date of the application for registration:

(h) Any condition, exception, reservation, charge, lien, or interest noted or endorsed hereon:

(i) The right of any person to show that the whole or any portion of the land is by wrong description of boundaries or parcels improperly included in this certificate:

(j) The right of any person to show fraud, wherein the registered owner or wherein the person from or through whom the registered owner derived his right or title otherwise than *bona fide* for value has participated in any degree:

(k) Any restrictive condition, right of reverter, or obligation imposed on the land by the "Forest Act" when noted and endorsed thereon.

From Certificate No. 266281-I

THE GOVERNMENT OF THE PROVINCE OF BRITISH COLUMBIA

No. 279236-I

FORM F (Section 142)

Certificate of Indefeasible Title

Date of application for registration, the 24th day of September at 2.40 p.m., 19 58

Register, Vol. 1103

This is to certify that JOHN UMLAND
Fisher Road
Cobble Hill, B. C.

is *absolutely and indefeasibly entitled in fee-simple, subject to such charges, liens, and interests as are notified by endorsement hereon, and subject to the conditions, exceptions, and reservations set out hereon, to* those *pieces of land situate in the* Cowichan Assessment District *and Province of British Columbia, and more particularly known and described as:—*

Lots	Seven (7) and Eight (8)
Section	Thirteen (13)
Range	Six (6)
District	Shawnigan
Plan	1038

FEB 1 -

THE FOLLOWING PIECES OF LAND HAVE BEEN TRANSFERRED:

LAND	CERT. NO.

In witness wherenf I have hereunto set my hand and seal of office

at Victoria, *British Columbia,*

this 7th *day of* October

19 58

Registrar.

{OVER}

This Certificate of Indefensible Title is void as against the title of any person adversely in actual possession of and rightly entitled to the land included in same at the time of the application upon which this Certificate was granted, and who continues in possession, and is subject to—

(a) The subsisting exceptions or reservations contained in the original grant from the Crown:

(b) Any Dominion or Provincial tax, rate, or assessment at the date of the application for registration imposed or made a lien or which may thereafter be imposed or made a lien on the land:

(c) Any municipal charge, rate, or assessment at the date of the application for registration imposed or which may thereafter be imposed on the land, or which had theretofore been imposed for local improvements or otherwise and which was not then due and payable, including any charge, rate, or assessment imposed by any public corporate body having taxing powers over an area in which the land is situate:

(d) Any lease, or agreement for lease, for a period not exceeding three years, where there is actual occupation under the same:

(e) Any public highway or right-of-way, watercourse, or right of water, or other public easement:

(f) Any right of expropriation by Statute:

(g) Any lis pendens or mechanics' lien, judgment, caveat, or other charge, or any assignment for the benefit of creditors or receiving order or authorized assignment under the "Bankruptcy Act," registered since the date of the application for registration:

(h) Any condition, exception, reservation, charge, lien, or interest noted or endorsed hereon:

(i) The right of any person to show that the whole or any portion of the land is by wrong description of boundaries or parcels improperly included in this certificate:

(j) The right of any person to show fraud, wherein the registered owner or wherein the person from or through whom the registered owner derived his right or title otherwise than *bona fide* for value has participated in any degree:

(k) Any restrictive condition, right of reverter, or obligation imposed on the land by the "Forest Act" when noted and endorsed hereon.

? *From Certificate No.*
A.F.B.Fol.29 Vol.6, No.26168-C

THE GOVERNMENT OF THE PROVINCE OF BRITISH COLUMBIA

246281

No. 266281-I

Certificate of Indefeasible Title

Date of application for registration, the 13th day of ~~May at 1.18 p.m.~~, 1957

Register, Vol. 1052

This is to certify that AGNES MARSHALL BELL, 331 Third St., Courtenay, B.C., and EVA JANE DANN, R. R. #1 Mill Bay, Cobble Hill, B.C., Executrices of the Will of Barbara Ann McMillan, deceased, D. F. 77293

are *absolutely and indefeasibly entitled in fee-simple, subject to such charges, liens, and interests as are notified by endorsement hereon, and subject to the conditions, exceptions, and reservations set out hereon, to* those

piece s of land situate in the Cowichan Assessment District *and Province of British Columbia, and more particularly known and described as:—*

Lots	Seven (7) and Eight (8)
Section	Thirteen (13)
Range	Six (6)
District	Shawnigan
Plan	1038

10/10/58

THE FOLLOWING PIECES OF LAND HAVE BEEN TRANSFERRED:

LAND	CERT. NO.
all	379236

In witness whereof *I have hereunto set my hand and seal of office*

at Victoria, *British Columbia,*

this 17th *day of* May

1957

Deputy *Registrar.*

[OVER]

Form No. 28—Land Registry Form A. Victoria Printing & Publishing Co., Victoria, B.C.

REGISTRY OFFICE VICTORIA, B.C.

No. ....

APPLICATION ONLY

THE GOVERNMENT OF THE PROVINCE OF BRITISH COLUMBIA

LAND REGISTRY ACT
FORM A
(Section 124.)

57 MAY 13 PM 1:18

266281-I

APPLICATION FOR REGISTRATION OF FEE-SIMPLE

Date April 24th, 19 57

I, Lance Heard, solemnly declare that I am [*or* Solicitor for *or* ~~the duly authorized Agent~~ of Agnes Marshall Bell and Eva Jane Dann, and that they are] entitled to be registered as the owner in fee-simple of the land hereunder described, and hereby make application under th provisions of the "Land Registry Act" and claim registration accordingly.

The full name, address, and occupation of the person so entitled to be registered as owner is Agnes Marshall Bell, 331 Third St., Courtenay, B.C. - Housewife
Eva Jane Dann, R.R. 1, Mill Bay, Cobble Hill, B.C. - Spinster

* Not applicable where the applicant is a corporation. Strike out words not applicable.

~~I am a British subject* [*Or*]~~ Executrix of the Will of Barbara Ann McMillan
~~I am not a British subject* [*Or*]~~

I am informed by the Applicants (Adapt to suit circumstances.) and verily believe, that the person so entitled to be registered as owner is a British subject

† For use where the application is made by a solicitor or agent.

~~[*or*] is not a British subject*†~~

The fee-simple is registered in Vol. ..... Fol. ..... of the Register

DESCRIPTION OF LANDS 26168 E

Municipality or Assessment District	Lot or Section	Admeasurement or Acreage
Cowichan	Lots 7 and 8 of West 80 acres of Section 13, Range 6, Map 1038 Shawnigan District	11/33

Do not write outside the side-line. Space reserved for binding.

LIST OF INSTRUMENTS

Date	Parties	Character of Deed
April 25th, 1957.	BARBARA ANN McMILLAN, also known as BARBARA ANN MacMILLAN, TO AGNES MARSHALL BELL and EVA JANE DANN, Executrixes of the Estate of Barbara Ann McMillan, also known as Barbara Ann MacMillan, deceased.	Certified Copy of Letters Probate Office Copy of Form SD1 Tax Certificates Certificate of Title on file

DF 77293

And I solemnly declare that I have investigated and ascertained the value of the said land, and that the fair market value thereof at the date of this application, including all buildings and improvements thereon erected, is $3,840.00 dollars, and that the title deeds mentioned hereon are all those in my custody, possession, or power, relating to the said land. [In case of a Solicitor or Agent, add] and to the best of my belief there are no other title deeds in the custody, possession, or power of the owner, relating to the same, and I am duly authorized by the above-named owner to make this application. [In the case of an Agent, add] and I reside in the Province of British Columbia, and am of the full age of twenty-one years.

And I make this solemn declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath and by virtue of the "Canada Evidence Act."

Declared before me this 10th day of ~~THIS~~ May, 1957 at Duncan, British Columbia.

(*Signature*) Lance Heard
of the Firm of Heard & MacDonald

(*Full Post Office Address*) P.O. Box 991, Duncan, B.C.

13617

WELL LOG CONSTRUCTION RECORD

OWNER Mr. Allan Cowan GRACE (1980 BISHOP?)

Address Fisher Rd. Cobble Hill B.C.

Well Location DL5

Date Started Nov. 29/1972 Date Completed Dec 6/1972

DRILLWELL ENTERPRISES LTD.
KEN SLADE - - Phone: 746-5268
R.R.1, COWICHAN STATION, B.C.

Drilling Method Percussion

Driller P. MISEK Helper —

File — Folio —

Signed By Pete Misek

LOG OF FORMATIONS

Depth		Descriptions
0	to 42	Sandy gravel
	to	
42	to 144	Gravely sand
	to	
144	to 167	Coarse gravel
	to	
167	to 187	Gravely sand
	to	
187	to 201	Sandy gravel waterbearing
	to	
201	to 218	Fine sand waterbearing
	to	
	to	
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	to	
	to	
	to	

GENERAL REMARKS

Screen slot no. 10 2 sect. (4 feet)

CASING RECORD

Dia. 6 ins. Wt. — #/ft. From 0 to 218

Dia. — ins. Wt. — #/ft. From — to —

Dia. — ins. Wt. — #/ft. From — to —

Shoe ✓ Welded ✓ Cemented —

SCREEN RECORD

Make CH Material Stainless steel

Slot opening no 10 Length 8' 2 sect.

Top 210 ft. Bottom 218 ft.

Fittings Top Bell joint Fittings Bottom bell bottom

Gravel Pack — Natural ✓

Development Method Bailing

ROCK WELL DATA

Open Bore Hole — Dia. — ins.

From — ft. to — ft.

PRODUCTION DATA

Static Level 180' ft.

Measured from surface

Pumping Level — ft. at — GPM

— ft. at — GPM

Bail Test — ft. at — GPH

— ft. at — GPH

Recommended Pump Setting — ft.

Recommended Max. Pump Output 20 GPM ~~GPH~~

Duration of Test — Hrs.

PUMP DATA

Make — Type —

Model — Serial No. —

Size — HP — Drop Pipe —

GPM — Head — ft.

Motor — Volts — PH

Well Seal —

Water Analysis — Hardness —

PH — Iron —

BRITISH COLUMBIA

Report 1 - Detailed Well Record

Well Tag Number: 102275

Owner: BISHOP

Address: 1355 FISHER ROAD

Area: COBBLE HILL

WELL LOCATION:
SHAWNIGAN Land District
District Lot: Plan: 29581 Lot: 1
Township: Section: 13 Range: 6
Indian Reserve: Meridian: Block:
Quarter:
Island: VANCOUVER ISLAND
BCGS Number (NAD 27): 092B063333 Well:

Class of Well: Water supply
Subclass of Well: Domestic
Orientation of Well:
Status of Well: New
Well Use:
Observation Well Number:
Observation Well Status:
Construction Method:
Diameter: inches
Casing drive shoe:
Well Depth: 210 feet
Elevation: feet (ASL)
Final Casing Stick Up: inches
Well Cap Type:
Bedrock Depth: feet
Lithology Info Flag: Y
File Info Flag: N
Sieve Info Flag: N
Screen Info Flag: N

Site Info Details:
Other Info Flag:
Other Info Details:

Construction Date: 1972-12-06 00:00:00.0

Driller: Drillwell Enterprises
Well Identification Plate Number:
Plate Attached By:
Where Plate Attached:

PRODUCTION DATA AT TIME OF DRILLING:
Well Yield: 20 (Driller's Estimate) Gallons per Minute (U.S./Imperial)
Development Method:
Pump Test Info Flag: N
Artesian Flow:
Artesian Pressure (ft):
Static Level: 180 feet

WATER QUALITY:
Character:
Colour:
Odour:
Well Disinfected: N
EMS ID:
Water Chemistry Info Flag:
Field Chemistry Info Flag:
Site Info (SEAM):

Water Utility:
Water Supply System Name:
Water Supply System Well Name:

SURFACE SEAL:
Flag: N
Material:
Method:
Depth (ft):
Thickness (in):

WELL CLOSURE INFORMATION:
Reason For Closure:
Method of Closure:
Closure Sealant Material:
Closure Backfill Material:
Details of Closure:

Screen from	to feet	Type	Slot Size

Casing from	to feet	Diameter	Material	Drive Shoe

GENERAL REMARKS:
 WELL ORIGINALLY DRILLED FOR MR. ALLAN COWAN.

LITHOLOGY INFORMATION:

From	0	to	42 Ft.	SANDY GRAVEL
From	42	to	144 Ft.	GRAVELY SAND
From	144	to	167 Ft.	COARSE GRAVEL
From	167	to	187 Ft.	GRAVELY SAND
From	187	to	201 Ft.	SANDY GRAVEL WATER BEARING
From	201	to	218 Ft.	FINE SAND WATER BEARING

THURBER ENGINEERING LTD.

SUMMARY OF WELL CONSTRUCTION DETAILS
for Wells in Study Area

Address	WELL TAG NO.	TOTAL DEPTH (feet)	TOTAL DEPTH (metres)	WATER DEPTH (feet)	WATER DEPTH (metres)	DIAM (inches)	DIAM (mm)	SCREEN SECTION (feet)	SCREEN SECTION (metres)
1355 Fisher Rd.	102275	218	66	180	55	6	152	210 to 218	64 to 66
1360 Fisher Rd.	24510	144	44	119	36	6	152	140 to 144	43 to 44
1375 Fisher Rd.	64066	238	73	147	45	6	152	234 to 238	71 to 73
1415 Galliers Rd.	68617	247	75	185	56	6	152	243 to 247	74 to 75

As Of: JUN 19, 2011 BC Online: Site Registry 11/06/23
For: PA82813 THURBER MANAGEMENT LTD. 13:26:44
Folio: 17-971-13 Page 1

PID Nil Search

As of JUN 19, 2011, no records from Site Registry match
Land Titles PID 001377892

You have been charged for this information.

Sites may be revealed by searching with alternate search methods. For example, a site not revealed in an Area search may be revealed by searching with another piece of information such as PID, PIN, address or Crown Lands File Number

As Of: JUN 19, 2011 BC Online: Site Registry 11/06/23
For: PA82813 THURBER MANAGEMENT LTD. 13:27:48
Folio: 17-971-13 Page 1

4 records selected for 0.5 km from latitude 48 deg, 41 min, 33.5 sec
and Longitude 123 deg, 35 min, 47.4 sec

Site Id	Lastupd	Address / City
0003203	03DEC30	1354 BALL ROAD COBBLE HILL
0004838	01JUN06	3740 TRANS CANADA HIGHWAY COBBLE HILL
0007430	06JUL18	1461 FISHER RD COBBLE HILL
0010759	08MAR28	1415 FAIRFIELD ROAD COBBLE HILL

As of: JUN 19, 2011 BC Online: Site Registry 11-06-23
For: PA82813 THURBER MANAGEMENT LTD. 13:30:40
Folio: 17-971-13 Page 1

Synopsis Report

SITE LOCATION
Site ID: 3203 Latitude: 48d 41m 30.0s
Victoria File: Longitude: 123d 35m 34.5s
Regional File: 26250-20/3203
Region: NANAIMO, VANCOUVER ISLAND

Common Name:
Site Address: 1354 BALL ROAD
City: COBBLE HILL Prov/State: BC
Postal Code:

Registered: APR 01, 1998 Updated: DEC 30, 2003 Detail Removed: DEC 23, 2003

Notations: 2 Participants: 5 Associated Sites: 0
Documents: 1 Susp. Land Use: 0 Parcel Descriptions: 0

Location Description: LAT/LONG DERIVED BY BC ENVIRONMENT REFERENCING THE TRANSPORTATION CENTRELINE NETWORK (TCN), NAD 83.

Status: INACTIVE - NO FURTHER ACTION
Fee category: SMALL SITE, SIMPLE CONTAMINATION

No Site Profile has been submitted for this site

End of Synopsis Report

COWICHAN VALLEY REGIONAL DISTRICT

LAND USE SERVICES DEPARTMENT

MEMORANDUM June 25, 1985

TO: Electoral Area Services Committee

SUBJECT: Application for Rezoning 1-C-85RS

BACKGROUND INFORMATION

Location: On the north side of Fisher Road across from the intersection of Ball Road.

Legal Description: Lot 1, Section 13, Range 6, Shawnigan District, Plan 29581

Date application and complete documentation received: April 17, 1985

Owner: Grace E. Bishop

Applicant: Same as above

Size of parcel (metric): 4.67 ha (imperial): 11.55 acres

Existing zoning: A-1 (Primary Agricultural)

Proposed zoning: I-1 (Light Industrial)

Minimum lot size under existing zoning: 12 hectares (30 acres)

Existing Settlement Plan Designation: Short Range: Agricultural, Long Range: Light Industrial

Proposed Settlement Plan Designation: Light Industrial

Existing use of property: Kennel plus ancillary car repairs, two single family dwellings.

Existing use of surrounding properties: East: woodworking mill and cordwood operation. South, East and North: rural residential

Services:

Road access: Paved via Fisher Road
Water: Private
Sewage Disposal: Septic

.../2

Agricultural Land Reserve Status: Removed 1984

THE PROPOSAL

The applicant wishes to rezone the property in order to eventually subdivide it in phases, for one acre industrial lots.

GOVERNMENT AND OUTSIDE AGENCY COMMENTS

Public Health Inspector: interests unaffected

Agricultural Land Commission: interests unaffected

Economic Development Officer: Approval recommended since:

- the short range period of the plan has elapsed

- there is a definite need for industrially zoned land in the southern part of the CVRD

Ministry of Transportation & Highways: interests unaffected

A subsequent telephone call to D. Raven, Highways Approving Officer, indicates that they are aware of the need for a road dedication along the westerly lot line to accommodate the re-alignment of Fisher Road, however, they intend to secure the right-of-way upon subdivision.

Cobble Hill Improvement District - no objections provided that if more than three lots (inclusive of the original parcel) are created, By-law #9 and #10 must be complied with (i.e. $2000 connection fee plus line extension on Fisher Road).

Mill Bay Volunteer Fire Department - approval recommended, however, the area must have a water system able to support hydrants according to standards. This is absolutely necessary in the area of Cobble Hill.

Water Management Branch - interests unaffected

Advisory Planning Commission - comments to be provided verbally at EAS Committee

PLANNING COMMENTS

The subject parcel is designated "light industrial", in the long range part of the Cobble Hill Official Settlement Plan. In addition, Policy 7.5 and 7.6 states the following regarding light industrial uses in the Fisher Road area:

..../3

POLICY 7.5:

Light industrial activities shall be accommodated in the Fisher Road area provided the following criteria are met and the industry is seen as beneficial to the community.

1. The area chosen for development is within easy access of a major local road.
2. The industry does not generate traffic through a residential area.
3. The industrial activity is compatible with the surrounding environment and land use and does not detract in any way from the area's present amenities.
4. The emission of any type of pollutants meet Regional and Provincial regulations.
5. The site has adequate services (hydro, water supply, sewage disposal area, etc.).

POLICY 7.6:

A natural state buffer or similar physical barrier shall be created to provide a screen between industrial operations and neighbouring uses and any public roadway.

It should be noted that in the short range plan, the property is designated "Primary Agricultural". Since the "short range" is defined as being "five to ten years (approximately)" from the date of the adoption of the plan, it is clear that this proposed rezoning is premature in the eyes of the short range plan and would, therefore, necessitate a plan amendment. Nevertheless, this proposal is in general agreement with the intent of the settlement plan. The principal problem appears to be related to water supply. The nearest water line is apparently 300 yards south-west of the property.

The subdivision by-law will not permit the subdivision of lots less than two acres (0.8 ha) unless connected to a community water supply, in which case the minimum lot size is one acre. The applicant has stated that there is an on-site well capable of producing 55 gallons per minute. A well of such capacity could easily supply enough water for a community water system to serve one acre industrial lots. Nevertheless, until the property is connected to a community water system (either the Cobble Hill system or a private one) the minimum lot size remains at 2 acres (.8 hectares).

As noted above in Policy 7.6, there is a requirement of a buffer strip between industrial uses and neighbouring properties and public roadways. In this case there would appear to be no need for a buffer along the westerly lot line (due to the future road in that location) nor along the north lot line (since this land is designated in the plan as industrial). However, along the Fisher Road frontage, some form of buffer strip, protected by covenant may be called for.

..../3

RECOMMENDATION

1. That application #1-C-85RS be approved and that the Planning Division be authorized to prepare amending by-laws that would:

a) re-designate the subject property from "Agricultural" in the short range of the Cobble Hill Settlement Plan to "Light Industrial"; and

b) re-zone the subject property from A-1 (Primary Agricultural) to I-1 (Light Industrial) in the Electoral Area "C" Zoning By-law #860.

2. That prior to fourth and final reading of the amending by-laws, that a restrictive covenant be registered (at the owner's expense) that would leave a strip of land 10 metres wide in its natural state (except for road accesses) along the full frontage of Fisher Road.

Russ Fuoco,
Planner

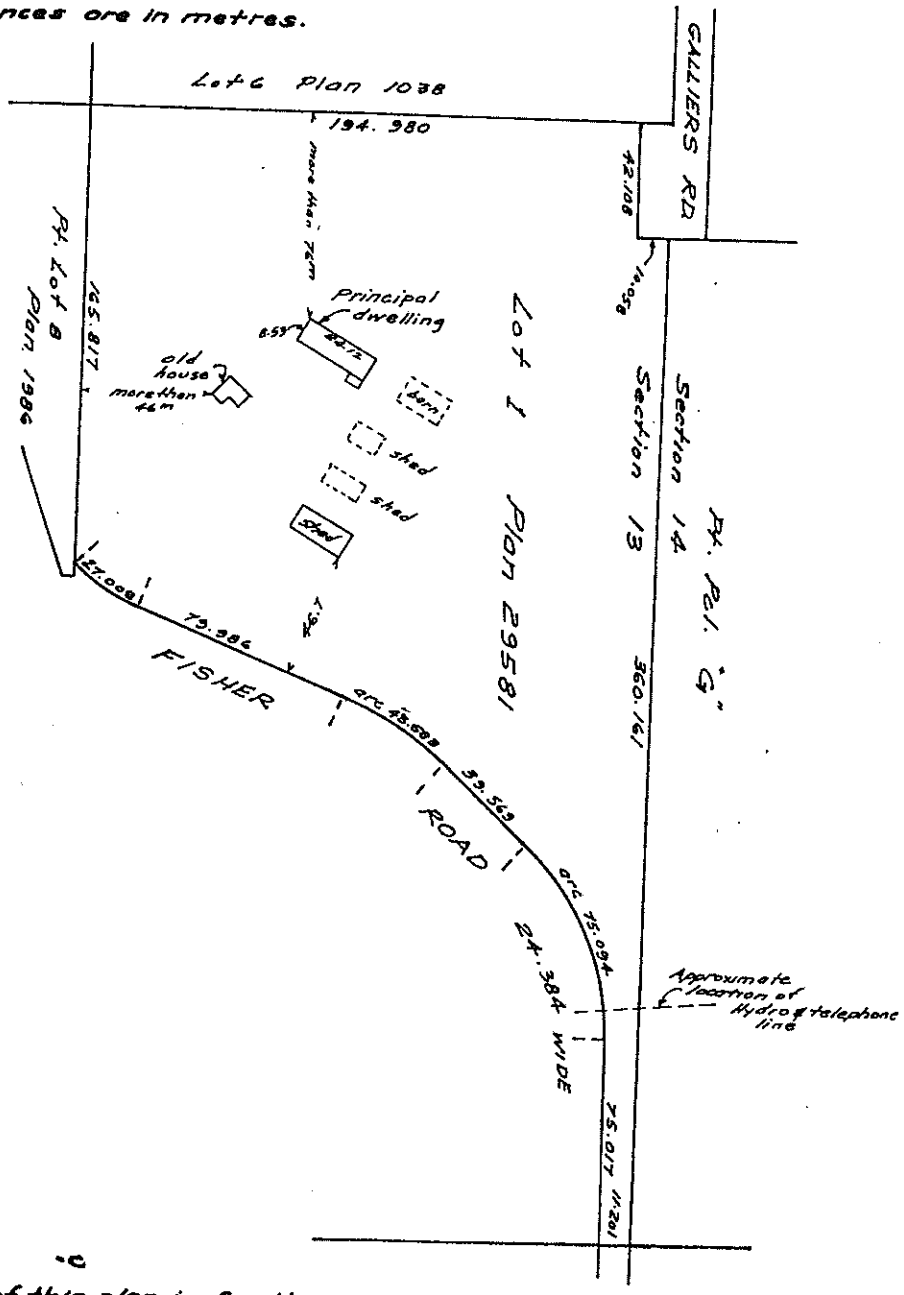
RF/ca

SITE SURVEY CERTIFICATE OF

LOT 1, SECTION 13, RANGE 6, SHAWNIGAN DISTRICT, PLAN 29581.

SCALE 1:2000

All distances are in metres.



The purpose of this plan is for the protection of the mortgagee only and not for the re-establishment of property boundaries.

Certified Correct this 16th day of May 1984

Michael H. Hanson B.C.L.S.
#1-5808 Trans-Canada Highway
Duncan, B.C. V9L 3S2
Telephone 746-4745

Michael H Hanson
B.C.L.S.

File 68 I

Maxxam

Success Through Science®

Your C.O.C. #: V004533

Attention: Kathleen Milward
Cowichan Valley Regional District
175 Ingram Street
Duncan, BC
Canada V9L 1N8

Report Date: 2011/08/30

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B173949
Received: 2011/08/11, 15:00

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water (1)	2	2011/08/15	2011/08/15	VIC SOP-00001	Based on SM2320B
Chloride by Automated Colourimetry	2	N/A	2011/08/16	BBY6SOP-00011	SM-4500-Cl-
Colour (True) (1)	2	N/A	2011/08/15	VIC SOP-00010	Based on SM-2120B
Coliforms & E.coli by Quantitray (MPN) (1)	2	N/A	2011/08/11	VIC SOP-00102	Based on SM-9223
Conductance - water (1)	2	N/A	2011/08/15	VIC SOP-00003	Based on SM-2510
Fluoride	2	N/A	2011/08/16	BBY6SOP-00038	SM - 4500 F C
Hardness Total (calculated as CaCO3)	2	N/A	2011/08/19		
Na, K, Ca, Mg, S by CRC ICPMS (total)	2	N/A	2011/08/19	BBY7SOP-00002	EPA 200.8
Elements by CRC ICPMS (total)	2	N/A	2011/08/18	BBY7SOP-00002	EPA 200.8
Nitrogen (Total)	1	2011/08/22	2011/08/22	BBY6SOP-00022	SM-4500N C
Nitrogen (Total)	1	2011/08/29	2011/08/29	BBY6SOP-00022	SM-4500N C
Ammonia-N	1	N/A	2011/08/17	BBY6SOP-00009	SM-4500NH3G
Ammonia-N	1	N/A	2011/08/18	BBY6SOP-00009	SM-4500NH3G
Nitrite (N) by CFA (1)	2	N/A	2011/08/12	VIC SOP-00005	Based SM-4500 NO2 B
Nitrate (N) (1)	2	N/A	2011/08/16	VIC SOP-00013	Based SM 4500 NO3 B
pH Water (1)	2	N/A	2011/08/15	VIC SOP-00006	Based on SM-4500 pH
Sulphate by Automated Colourimetry	1	N/A	2011/08/16	BBY6SOP-00017	SM4500-SO42
Sulphate by Automated Colourimetry	1	N/A	2011/08/17	BBY6SOP-00017	SM4500-SO42
Total Dissolved Solids (Filt. Residue) (1)	2	N/A	2011/08/16	VIC SOP-00008	Based on SM 2540C
Total Phosphorus (1)	2	N/A	2011/08/16	VIC SOP-00007	Based on SM 4500 P E
Turbidity (1)	2	N/A	2011/08/15	VIC SOP-00011	Based on SM - 2130

* Results relate only to the items tested.

(1) This test was performed by Maxxam Victoria

../2

Cowichan Valley Regional District

Maxxam Job #: B173949
Report Date: 2011/08/30

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

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Total cover pages: 2

Cowichan Valley Regional District

Maxxam Job #: B173949
Report Date: 2011/08/30

STANDARD POTABILITY WITH MICRO (WATER)

Maxxam ID						BF8056		BF8057		
Sampling Date						2011/08/11 09:30		2011/08/11 09:30		
	Units	**Criteria A**	**Criteria B**	**Criteria C**	**Criteria 2 A**	**1375 FAIRFIELD RD DOMESTIC WELL (EDWARD GAMBOA)**	**QC Batch**	**1360 FISHER RD IRRIGATION HOLDING TANK (GAMBOA GREENHOUSES)**	**RDL**	**QC Batch**
ANIONS										
Nitrite (N)	mg/L	**1**				<0.002	5088621	0.120	0.002	5088621
Calculated Parameters										
Total Hardness (CaCO3)	mg/L	**5**	20	100		184	5085686	566	0.5	5085686
Misc. Inorganics										
Fluoride (F)	mg/L	**1.5**				0.05	5094359	0.14	0.01	5094359
Alkalinity (Total as CaCO3)	mg/L					104	5092526	58	2	5092526
Anions										
Dissolved Sulphate (SO4)	mg/L				**500**	10	5098910	130	0.5	5101344
Dissolved Chloride (Cl)	mg/L				**250**	53	5098887	35	0.5	5098887
MISCELLANEOUS										
True Colour	Col. Unit				**15**	<5	5093080	<5	5	5093080
Nutrients										
Nitrate (N)	mg/L	**10**				2.00	5095237	**110**	0.04	5100947
Physical Properties										
Conductivity	uS/cm					407	5092485	1670	1	5092485
pH	pH Units				**6.5:8.5**	6.7	5092525	6.9		5092525
Physical Properties										
Total Dissolved Solids	mg/L				**500**	296	5094035	378	10	5094035
Turbidity	NTU					0.1	5093079	1.0	0.1	5093079

RDL = Reportable Detection Limit
Criteria A, Criteria B, Criteria C: CDWQG Potability (Health Criteria at Point of Use / Distribution) - for Victoria requirement for <1 micro RDLs
Criteria 2 A: Aesthetic Objective as set by "Guidelines for Canadian Drinking Water Quality."

Cowichan Valley Regional District

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Sampling Date						2011/08/11 09:30		2011/08/11 09:30		
	Units	**Criteria A**	**Criteria B**	**Criteria C**	**Criteria 2 A**	**1375 FAIRFIELD RD DOMESTIC WELL (EDWARD GAMBOA)**	**QC Batch**	**1360 FISHER RD IRRIGATION HOLDING TANK (GAMBOA GREENHOUSES)**	**RDL**	**QC Batch**
Total Metals by ICPMS										
Total Aluminum (Al)	ug/L					<3	5094633	4	3	5094633
Total Antimony (Sb)	ug/L	**6**				<0.5	5094633	<0.5	0.5	5094633
Total Arsenic (As)	ug/L	**10**				<0.1	5094633	0.5	0.1	5094633
Total Barium (Ba)	ug/L	**1000**				8	5094633	28	1	5094633
Total Boron (B)	ug/L	**5000**				<50	5094633	417	50	5094633
Total Cadmium (Cd)	ug/L	**5**				<0.01	5094633	0.13	0.01	5094633
Total Chromium (Cr)	ug/L	**50**				2	5094633	1	1	5094633
Total Cobalt (Co)	ug/L					<0.5	5094633	0.7	0.5	5094633
Total Copper (Cu)	ug/L				**1000**	48.9	5094633	33.3	0.2	5094633
Total Iron (Fe)	ug/L				**300**	15	5094633	**914**	5	5094633
Total Lead (Pb)	ug/L	**10**				1.2	5094633	0.4	0.2	5094633
Total Manganese (Mn)	ug/L				**50**	<1	5094633	**277**	1	5094633
Total Mercury (Hg)	ug/L	**1**				<0.05	5094633	<0.05	0.05	5094633
Total Molybdenum (Mo)	ug/L					<1	5094633	29	1	5094633
Total Nickel (Ni)	ug/L					<1	5094633	4	1	5094633
Total Selenium (Se)	ug/L	**10**				0.1	5094633	<0.1	0.1	5094633
Total Silver (Ag)	ug/L					<0.02	5094633	0.04	0.02	5094633
Total Uranium (U)	ug/L	**20**				<0.1	5094633	<0.1	0.1	5094633
Total Vanadium (V)	ug/L					<5	5094633	<5	5	5094633
Total Zinc (Zn)	ug/L				**5000**	14	5094633	261	5	5094633
Total Calcium (Ca)	mg/L					51.6	5086522	168	0.05	5086522
Total Magnesium (Mg)	mg/L					13.4	5086522	35.6	0.05	5086522
Total Potassium (K)	mg/L					0.61	5086522	139	0.05	5086522
Total Sodium (Na)	mg/L				**200**	6.87	5086522	11.2	0.05	5086522
Microbiological Param.										
E. coli	MPN/100mL	**0**				<1	5086873	<1	1	5086873
Total Coliforms	MPN/100mL	**0**				<1	5086873	**2**	1	5086873

RDL = Reportable Detection Limit
Criteria A, Criteria B, Criteria C: CDWQG Potability (Health Criteria at Point of Use / Distribution) - for Victoria requirement for <1 micro RDLs
Criteria 2 A: Aesthetic Objective as set by "Guidelines for Canadian Drinking Water Quality."

Cowichan Valley Regional District

Maxxam Job #: B173949
Report Date: 2011/08/30

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		BF8056			BF8057		
Sampling Date		2011/08/11 09:30			2011/08/11 09:30		
	Units	**1375 FAIRFIELD RD DOMESTIC WELL (EDWARD GAMBOA)**	**RDL**	**QC Batch**	**1360 FISHER RD IRRIGATION HOLDING TANK (GAMBOA GREENHOUSES)**	**RDL**	**QC Batch**
Nutrients							
Ammonia (N)	mg/L	0.011	0.005	5101175	6.5	0.05	5105402
Total Nitrogen (N)	mg/L	2.33	0.04	5111795	170	2	5131502
Total Phosphorus (P)	mg/L	0.010	0.003	5094038	18.6	0.003	5094038

RDL = Reportable Detection Limit

Cowichan Valley Regional District

Maxxam Job #: B173949
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Package 1	14.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

General Comments

Cowichan Valley Regional District

Maxxam Job #: B173949
Report Date: 2011/08/30

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
5086873	E. coli	2011/08/11							NC	50
5086873	Total Coliforms	2011/08/11							NC	45
5088621	Nitrite (N)	2011/08/12	98	79 - 115	102	80 - 122	<0.002	mg/L	NC	20
5092485	Conductivity	2011/08/15			101	96 - 104	<1	uS/cm	0	20
5092526	Alkalinity (Total as CaCO3)	2011/08/15	104	80 - 120	96	80 - 120	<2	mg/L	1.1	20
5093079	Turbidity	2011/08/15			94	80 - 120	<0.1	NTU	NC	20
5093080	True Colour	2011/08/15			100	94 - 106	<5	Col. Unit	NC	10
5094035	Total Dissolved Solids	2011/08/16			119	80 - 120	<10	mg/L	0	20
5094038	Total Phosphorus (P)	2011/08/16	99	90 - 110	99	88 - 108	<0.003	mg/L	NC	20
5094359	Fluoride (F)	2011/08/16	100	80 - 120	102	80 - 120	<0.01	mg/L	0	20
5094633	Total Antimony (Sb)	2011/08/18	105	80 - 120	107	80 - 120	<0.5	ug/L	NC	20
5094633	Total Arsenic (As)	2011/08/18	99	80 - 120	99	80 - 120	<0.1	ug/L	2.6	20
5094633	Total Barium (Ba)	2011/08/18	97	80 - 120	102	80 - 120	<1	ug/L	NC	20
5094633	Total Cadmium (Cd)	2011/08/18	100	80 - 120	102	80 - 120	<0.01	ug/L	NC	20
5094633	Total Chromium (Cr)	2011/08/18	96	80 - 120	96	80 - 120	<1	ug/L	NC	20
5094633	Total Cobalt (Co)	2011/08/18	95	80 - 120	97	80 - 120	<0.5	ug/L	NC	20
5094633	Total Copper (Cu)	2011/08/18	93	80 - 120	97	80 - 120	<0.2	ug/L	0.5	20
5094633	Total Iron (Fe)	2011/08/18	NC	80 - 120	103	80 - 120	<5	ug/L	0.6	20
5094633	Total Lead (Pb)	2011/08/18	98	80 - 120	105	80 - 120	<0.2	ug/L	NC	20
5094633	Total Manganese (Mn)	2011/08/18	NC	80 - 120	99	80 - 120	<1	ug/L	0.3	20
5094633	Total Mercury (Hg)	2011/08/18	106	80 - 120	103	80 - 120	<0.05	ug/L	NC	20
5094633	Total Molybdenum (Mo)	2011/08/18	103	80 - 120	105	80 - 120	<1	ug/L	NC	20
5094633	Total Nickel (Ni)	2011/08/18	95	80 - 120	97	80 - 120	<1	ug/L	NC	20
5094633	Total Selenium (Se)	2011/08/18	101	80 - 120	103	80 - 120	<0.1	ug/L	NC	20
5094633	Total Silver (Ag)	2011/08/18	107	80 - 120	114	80 - 120	<0.02	ug/L	NC	20
5094633	Total Uranium (U)	2011/08/18	105	80 - 120	107	80 - 120	<0.1	ug/L	NC	20
5094633	Total Vanadium (V)	2011/08/18	98	80 - 120	96	80 - 120	<5	ug/L	NC	20
5094633	Total Zinc (Zn)	2011/08/18	NC	80 - 120	99	80 - 120	<5	ug/L	0.8	20
5094633	Total Aluminum (Al)	2011/08/18					<3	ug/L	NC	20
5094633	Total Boron (B)	2011/08/18					<50	ug/L	NC	20
5095237	Nitrate (N)	2011/08/16	105	N/A	114	N/A	<0.04	mg/L	3.9	20
5098887	Dissolved Chloride (Cl)	2011/08/16	NC	80 - 120	102	80 - 120	<0.5	mg/L	0.7	20
5098910	Dissolved Sulphate (SO4)	2011/08/16	97	80 - 120	99	80 - 120	<0.5	mg/L	NC	20
5101175	Ammonia (N)	2011/08/17	100	80 - 120	97	80 - 120	<0.005	mg/L	1.4	20
5101344	Dissolved Sulphate (SO4)	2011/08/17	NC	80 - 120	104	80 - 120	<0.5	mg/L	0.7	20
5105402	Ammonia (N)	2011/08/18			102	80 - 120	0.006, RDL=0.005	mg/L	5.9	20

Cowichan Valley Regional District

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QUALITY ASSURANCE REPORT

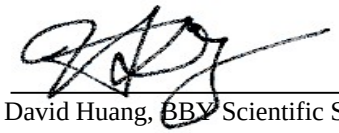
			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
5111795	Total Nitrogen (N)	2011/08/22	NC	80 - 120	92	80 - 120	<0.02	mg/L	3.9	20
5131502	Total Nitrogen (N)	2011/08/29	TBA	80 - 120	99	80 - 120	<0.02	mg/L	1.2	20

N/A = Not Applicable
RDL = Reportable Detection Limit
RPD = Relative Percent Difference
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

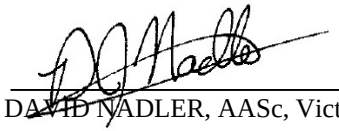
Validation Signature Page

Maxxam Job #: B173949

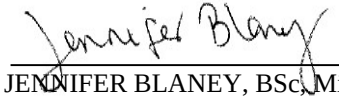
The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



David Huang, BBY Scientific Specialist



DAVID NADLER, AASc, Victoria Operations Manager



JENNIFER BLANEY, BSc, Microbiology Group Coordinator

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Photo 1: Looking northwest at the entrance from Fisher Road. The large white building is the compost receiving and processing building. The green buildings at left are storage bins for the recycling centre. The scale is in the foreground.

Photo 2: Looking southeast at the north end of two of the PVC covered bio-filter buildings (on right), with a portion of the south end of the outdoor curing pad air floor visible on the left and compost curing building behind. The fence on the right is for a leachate pond.

Photo 3: Looking west at the existing well shed (on right) with an air floor curing pad in the foreground.

Photo 4: Secondary compost piles located inside the compost receiving and processing building.

Photo 5: Looking north towards the compost curing (receiving) building with the composting vessels building on the right and bio-filter building on the left. The green tanks are used for temporarily holding any excess leachate generated in the vessels. The small shed (background left) holds a tank used to temporarily store and treat collected condensation water.

Photo 6: Piles of wood and garden waste in the chipping area. Area has a concrete floor and the storm water is collected.

Photo 7: Piles in the screening area at the northwest corner of the site. Note concrete pad.

Photo 8: Swale area near the eastern property boundary. The edge of the recycling area pad is visible on the left with the oil/water separators visible at left.

Photo 9: Looking at the exterior of the greenhouse building at 1375 Fairfield Road.

Photo 10: Irrigation water holding tanks and mixing area at 1360 Fisher Road.

Photo 11: Looking west towards the stockpile holding and processing area at the central and west side of 1345 Fisher Road. The large white building in the distance is the compost receiving building at 1355 Fisher Road.

Photo 12: Looking east at maturing compost piles located at the western end of the property at 1345 Fisher Road from near the western property boundary with 1355 Fisher Road.

Composting
FACTSHEET

BRITISH COLUMBIA
Ministry of Agriculture and Food

Order No 382.500-11
Agdex 537/727
September, 1996

COMPOSTING

◆ ENVIRONMENTAL CONCERNS ◆

Composting organic material has many benefits. Organic wastes are diverted from landfill or other disposal sites. Composted material can be used as a soil amendment or nutrient source. Composting stabilizes some of the nutrients in wastes so that they are not as readily leached out. This decreases the potential for ground and surface water contamination. The use of compost on low organic matter soils results in improved moisture and nutrient retention, decreased soil erosion, reduced surface crusting, suppression of plant diseases and improved soil tilth. Composting of organic wastes kills weed seeds, pathogenic bacteria and viruses.

There are environmental risks associated with composting and compost use. Some risks are inevitable, but others are related to improper compost production or improper use. Ground and surface water pollution can occur as a result of improper use of compost. Air pollution can also occur when composting. See Regulations Affecting Composting, Factsheet No. 382.500-12, for more information on regulation.

ENVIRONMENTAL CONCERNS DURING PRODUCTION OF COMPOST

Water Quality

Composting of organic wastes must be performed only in locations where leaching of pollutants from the operation is minimized. The leachable pollutants in agricultural waste include bacteria (some pathogenic), phenolic compounds, ammonium nitrogen, nitrate nitrogen, potassium, and water containing a high biochemical oxygen demand. Potential pollutants from composting municipal or industrial wastes include heavy metals and petrochemical compounds.

Composting wastes must be protected from rainfall that can leach pollutants. Composting should be performed on an impervious surface, such as a concrete pad. Facilities to contain runoff in order to prevent leaching and diffusion of pollutants into the soil and/or groundwater must be provided. No runoff can be discharged without a permit from the B.C. Ministry of Environment, Lands and Parks. See Site Selection for Composting, Factsheet No. 382.500-6, for an example of a runoff and leachate collection system.

Air Quality

Composting of organic wastes also results in the formation of products that affect air quality such as: ammonium; NO_x; methane, and of other potential harmful organic compounds. Odours are typically generated as well.

Odour: Odour is often the most noticeable air quality concern. Most organic wastes will generate some foul odour during the composting process. Foul odour increases when the composting material is allowed to become anaerobic. Therefore, odours can be minimized with proper aeration. Prevailing wind direction and proximity to residential areas are important factors to take into consideration in selecting sites for composting. Biofilters are an option with aerated static pile composting, or if the compost facility is enclosed within a building.

Ammonia (NH4): Ammonia acidifies rain, contaminates surrounding areas with excess nitrogen (N) and causes foul odours.

Ammonia loss is inevitable in most composting facilities. However, those with low C:N ratios wastes will result in the greatest ammonia losses. Addition of wastes with high C:N ratios may reduce ammonia loss only if the carbon (C) is easily degradable. Thus, addition of high carbon woodwastes is not very effective because carbon in such products is released slowly.

Nitrous Oxide and Other NOx Gases: During intense microbial activity, as occurs in the compost process, there is significant loss of nitrogen as nitrous oxide and other NO_x gases, particularly nitric oxide (NO). Nitrous oxide (N_2O), for example, is 240 times more harmful than CO_2 in contributing to global warming. It is a stable gas and diffuses to the stratosphere where it destroys ozone. At present, there is little research on the management of these gases during composting.

Methane (CH4): There is some indication that the diversion of organic wastes away from landfills will reduce the production of anthropogenic (produced by human activities) methane. While this diversion of wastes will reduce methane emissions, unfortunately there may be increased NO_X emissions as a result.

ENVIRONMENTAL CONCERNS ASSOCIATED WITH THE USE OF COMPOST

Water Quality

Although many of the nutrients in compost have been stabilized during the composting process, they can contribute to leaching over the long term. Heavy applications of compost may release more nitrogen than can be utilized by the crop, with subsequent risk of groundwater pollution. Therefore applications of compost should be based on the availability of mineralizable nutrients such as nitrogen for crop requirements. See **Using Compost**, Factsheet No. 382.505-15, for discussion on proper use of compost.

Disease and Weed Transmittance

If composted properly, potentially harmful bacteria, viruses, and weed seeds, are destroyed by high temperatures of 55° to 60 °C (130° to 140 °F) for three days. Achieving these temperatures should therefore be a priority. Potential users will be reluctant to utilize compost if they have experienced disease or weed infestations resulting from improper management.

This is one of a series of Factsheets on Composting. A list of references used in producing this series is included in the Composting Factsheet "Suggested Reading and References."

COMPOSTING FACTSHEET SERIES PREPARED BY:
Hog Producers Sustainable Farming Group;
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Agriculture and Agri-Food Canada; and
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