

February 17, 2023
PGL File: 0346-65.01

Via E-mail: Krista.Englund@gov.bc.ca

Ministry of Transportation and Infrastructure
310 – 1500 Woolridge Street
Coquitlam, BC
V3K 0B8

Attention: Krista Englund

RE: ARBORIST SUMMARY REPORT – REDROOFS ROAD AND DAY ROAD, SECHelt, BC

PGL Environmental Consultants (PGL) is pleased to provide this arborist summary report related to flood and infrastructure remedial works at the convergence of Redroofs Road and Kenyon Creek (Kenyon Creek Site), the convergence of Day Road and Gough Creek (Gough Creek Site), and the convergence of Day Road and Clack Creek (Clack Creek Site) in Sechelt, BC within the territories of the shísháhl Nation.

1.0 BACKGROUND

The Ministry of Transportation and Infrastructure (MOTI) retained PGL to complete an Environmental Overview Assessment (EOA) of proposed flood damage remediation works to Redroofs Road at Kenyon Creek on the Sunshine Coast (Figure 1), as well to Day Road at both the Gough Creek and Clack Creek crossings (Figure 2).

In November 2021 there was an extreme atmospheric river rainfall event that led to widespread flooding in southwestern British Columbia. During the extreme rainfall event, existing culverts conveying water under Redroofs Road and Day Road were plugged by debris. High creek flows resulted in the creeks overtopping the roads causing infrastructure damage.

Emergency works to alleviate the flooding, stabilize banks, and repair infrastructure (roads) were implemented immediately. The emergency works were considered temporary, as a more permanent design was developed and approved. PGL prepared EOA reports for both the Redroofs Road and Day Road repair works for submission to appropriate regulatory agencies in December 2022. The proposed permanent remedial works are being reviewed by the appropriate regulatory agencies and construction is intended to begin in August 2023.

Subsequent to the permanent repair works, PGL's International Society of Arboriculture (ISA) Certified Arborist was asked to review remaining trees within the footprint of the disturbance and remedial works. The following report summarizes the results of the arboriculture review.

1.1 Bylaw Overview

The District of Sechelt (the District) has two bylaws in place governing the protection of trees:

- The Parks Tree Protection Bylaw (No. 436); and
- The Environmental Management and Protection Bylaw (No. 484).

The Parks Tree Protection Bylaw applies to any land or property owned or managed by the District that is designated or considered park. In addition to this, the Environmental Management and Protection Bylaw includes an exemption for any tree removal or pruning required for the installation, repair, or maintenance of public works or services carried out by or under the authority of the District on a highway, right-of-way, or easement held by the District. Therefore, it is assumed that both bylaws do not apply to the Sites defined above or the work completed and proposed.

2.0 METHODOLOGY

PGL's ISA Certified Arborist (PN-6291A) completed a field review of tree conditions within the footprint of the floods and remedial works on August 25, 2022. An initial Level 1: Limited Visual Assessment¹ was conducted for trees occurring within disturbed areas to determine the most efficient route for assessing the population of potentially impacted trees, and for locating trees requiring a higher level of assessment (i.e., Level 2: Basic Assessment).

The Level 1 Assessment was completed to identify obvious/significant defects or other conditions of concern within the existing tree resources (e.g., trees with abnormal leans or growth patterns, obvious/significant wounds or deformities, standing dead trees, trees in significant decline, or trees with significant signs of disturbance and inundation). The objective of this assessment was to identify potential conditions that may pose a high risk to human health or property adjacent to the Sites, which should be mitigated in the short term. This included potential targets within and adjacent to the Sites.

This Level 1 risk assessment considered a timeframe of two years from the date of field review (i.e., August 25, 2022), and is based on conditions at the time of assessment. It is assumed that if additional works, repairs, maintenance, or upgrades are completed, or if another flooding event occurs, the MOTI will conduct additional risk assessments for retained tree resources on the Sites.

A Level 2: Basic Assessment was completed for trees identified in the Level 1 assessment as requiring further review. The Level 2 assessment was completed as per the methodology defined in the ISA *Tree Risk Assessment Manual*, as well as the provincial Wildlife/Danger Tree Assessment methods. For Level 2-assessed trees, numerical tags were installed, and locations were approximated on a map². General information such as species, diameter at breast height (dbh), height, and general vitality/condition were recorded, as well as descriptions of any observed conditions of concern/defects and potential existing targets.

The validity of the assessment is limited in its methods, as well as due to the potential for changing conditions in and around the Sites (e.g., future road improvements). Any future development at or adjacent to the Sites could alter conditions and potential targets. Additional limitations to the assessment include, but are not limited to:

- Consideration of only known, current targets and visible tree conditions;
- Assessment of only trees documented in this report;
- Assessment of the condition of the trees and Sites at the time of inspection;
- Assessment restricted to a Level 1: Limited Visual Assessment, unless noted otherwise;
- Completion of the assessment from the ground only (no soil tests or below-grade root examinations were performed, nor were aerial inspections);
- Acknowledgment that the timeframe for risk categorization is not to be considered a guaranteed period; and
- Acknowledgment that any tree, whether it has visible weaknesses or not, will fail if the forces applied exceed the strength of the tree or its parts.

¹ Dunster, Julian A., E. Thomas Smiley, Nelda Matheny, and Sharon Lilly. 2013. *Tree Risk Assessment Manual*. Champaign, Illinois, International Society of Arboriculture.

² Tree locations have not been surveyed by a qualified BC Land Surveyor. Accurate tree positions are not recommended at this time.

3.0 SUMMARY OF OBSERVATIONS AND RECOMMENDATIONS

The following sections summarize our observations and recommendations for each of the Sites.

3.1 Kenyon Creek Site

The existing stand at the Kenyon Creek Site at Redroofs Road (Figure 1) was characterized by a mixed forest dominated by red alder (*Alnus rubra*), bigleaf maple (*Acer macrophyllum*), and western redcedar (*Thuja plicata*). Pre-disturbance, the riparian forest appeared to be well established up to the previous limit of the roads fill slope, with some trees occurring on the lower portion of the fill slope.

A significant amount of ground disturbance was evident from scour, movement of debris, inundation, sediment deposition, and subsequent construction including removal of debris, regrading, culvert replacement, and placement of slope armouring measures (i.e., riprap). By far, most of the disturbance was observed on the upstream side of Redroofs Road with notable scour, exposed root systems, and wounds on tree stems. Several trees were recently dead or in significant decline.

Impacts to trees at the Kenyon Creek Site upstream of Redroofs Road were significant enough that a more thorough tree inventory was completed for trees occurring within the impacted zone. Table 1 (attached) provides a summary of trees inventoried and assessed, including numerical tags installed, species, dbh, height, and comments regarding general vitality/condition. A summary of tree risk assessment results associated with each tree and mitigation recommendations is also provided. Associated photos are provided in Appendix A (Photographs 1 to 18).

Upon further review of the photographic record collected during the field review, one additional tree that was not inventoried at the Kenyon Creek Site appeared to be of concern. The tree was located directly north of Tree #328 and can be seen in Photograph 19. The tree appeared to have fungal fruiting bodies throughout the main stem, suggesting internal rot. It is recommended that this tree be removed to grade, with the stump retained.

Impacts to trees on the downstream side of Redroofs Road appeared to be limited to an intermediate western redcedar on the west side of Kenyon Creek immediately adjacent to the culvert outfall, and a young red alder on the east side of the creek roughly 3–4m downstream of the redcedar tree (Photograph 20). Both trees have been partially buried at the base with what appears to be newly placed riprap. It is assumed that placement of the large rock also wounded the buried portion of the trees.

The western redcedar tree downstream of Redroofs Road appeared to be in moderate decline, which is likely more related to climatic changes (i.e., prolonged summer drought conditions with extreme heat) than the recent works completed along the banks of Kenyon Creek. The vitality of the red alder appeared to be normal with no visible dieback or stress. There is a chance that placement of the riprap around the base of these trees could have long-term effects (i.e., soil compaction, physical wounds creating point of entry for decay, etc.); however, no mitigation is recommended at this time. These two trees should be reviewed in two years to reassess vitality.

3.2 Gough Creek Site

Similar to the Kenyon Creek Site, the existing forest canopy at the Gough Creek Site (Figure 2) was characterized by a mixed stand of western redcedar and red alder, as well as western hemlock (*Tsuga heterophylla*). There was no obvious disturbance or damage to trees on the downstream side of Day Road at the Gough Creek Site. Existing trees appeared to occur outside the zone of impact from the culvert washout (Photograph 21).

Impacts to trees on the upstream side of Day Road appeared to be limited. It is likely that trees adjacent to the road and further upstream were inundated for a period before the culvert failed; however, significant impacts from such conditions were not evident.

The most notable and prolonged impacts to trees on the upstream side of Day Road at the Gough Creek Site appeared to be partial burial of trees immediately adjacent to the road. The fill slope created from road repairs and/or widening extended down and around several red alder trees that occurred in this location (Photographs 22 through 25). The trees affected by the material placement appeared to be in good health at the time of review, although a few had some dieback in the upper portions of the canopy which was likely present prior to the flood event.

In the long-term, it is likely that the fill slope material will adversely affect the health of these trees. Soil compaction and burial could suffocate root systems, causing a gradual decline in tree vitality (i.e., over next few years). If the trees do decline, the likelihood of failure will increase. The likelihood of failed trees falling towards Day Road is high. Traffic frequency on Day Road is unknown, so the likelihood of a failure impacting a car and occupants is uncertain; however, it is very likely that a tree failure would result in disruption of traffic flow.

At a minimum, the affected trees should be reviewed within the next two growing seasons to assess impacts, monitor potential decline, and prescribe mitigation measures, as needed. As a precautionary measure, the MOTI may consider removing the affected trees to roughly 1m above grade to mitigate expected future risks.

3.3 Clack Creek Site

The forest on the upstream side of Day Road at the Clack Creek Site (Figure 2) was dominated by a pole/sapling deciduous red alder stand (Photograph 26). Comparatively, the downstream stand was a young to maturing coniferous forest dominated by western redcedar (Photograph 26).

Disturbance was more evident on the downstream side of Day Road. Debris, including sections of the washed-out culvert were spread throughout the floodplain and into the forest (Photograph 27). A failed, young red alder tree was uprooted and extended across the stream, and other failed young western redcedar trees occurred on the floodplain paralleling the main channel. Geomorphological changes of the floodplain likely occurred; however, the scale is uncertain without a comparative baseline. It is possible that some root systems of remaining trees were disturbed, but stress in trees was not evident, nor did any trees appear to be in significant decline (Photograph 28).

No tree removals or modifications are recommended at this time for the forest stand downstream of Day Road at the Clack Creek Site. Tree health should be monitored over the next two growing seasons. If work is required to remove debris, we recommend retaining an arborist to provide guidance through construction and to assess retained trees once debris has been removed.

Like the Gough Creek Site, impacts to trees on the upstream side of Day Road at the Clack Creek Site appeared to be limited. It is likely that trees adjacent to the road and further upstream were temporarily inundated before the culvert failed; however, significant impacts from such conditions were not evident (Photograph 29). Some bank erosion was evident adjacent to the culvert inlet with some exposed and damage roots (Photograph 30). However, the red alder trees within this area did not appear to be in significant decline (Photograph 31) or likely to fail in the immediate future (i.e., within the next two years).

4.0 CONSTRUCTION MITIGATION

It is our understanding that the permanent remedial works are planned for Summer 2023. These additional works have the potential to result in adverse impacts to retained trees if appropriate mitigation measures are not implemented and adhered to.

It is recommended that a Tree Protection Plan be prepared for each of the Sites, which would involve inventorying trees within the potential footprint of the permanent remedial works, surveying inventoried tree locations, and assessing realistic tree retention given the project design and construction needs (i.e., cut/fill limits, grading, excavation, access logistics, staging areas, etc.). The Tree Protection Plan would include specified *Tree Protection Zones* (TPZs) which would consist of two primary components:

- **Crown Protection Zone (CPZ):** the dripline of the tree defined by the furthest extent of branches and foliage projected to the ground below; and
- **Critical Root Protection Zone (RPZ):** a setback prescribed by the project arborist representing the closest proximities of soil and root disturbance toward a tree that are deemed manageable and tolerable based on site and tree factors.

If time does not permit preparation of site-specific Tree Protection Plans, as a minimum, the following mitigation measures should be implemented:

- Retaining a qualified Project Arborist for guidance and monitoring during construction;
- Ensuring vegetation clearing, including tree removal and/or pruning work, is completed within a defined least-risk window for nesting birds, whenever possible (i.e., September 1 through to February 28):
 - If vegetation clearing cannot occur within the least-risk window (i.e., clearing is proposed between March 1 and August 31), then a Qualified Environmental Professional should be retained to conduct pre-clearing nest surveys per provincial standards to maintain compliance with applicable regulations.
- Installing tree protection barriers around the dripline of retained trees, as a minimum and in the absence of estimated Critical Root Protection Zones:
 - Any proposed modifications to barrier alignment should be reviewed and approved by the Project Arborist prior to the start of work.
- Constructing tree protection barriers of sturdy and highly visible fencing materials and at a minimum height of 1.2m from grade. As a standard:
 - Constructing tree protection barriers with 2"x4" pieces of wood, which are to be used for vertical posts, top and bottom rails, and cross-bracing;
 - Establishing vertical posts in the tree protection barrier at ~3.5m spacing that are driven into the ground, where possible, or otherwise anchored/secured to the ground; and
 - Including signage installed on the tree protection barrier identifying the area as a "Tree Protection Zone" and stating that no encroachment, storage of materials, or damage to trees is permitted within the zone. Signage spacing should not exceed 15m on centre.
- Having the Project Arborist review any proposed barrier substitutions or design modifications prior to installation;
- Having the Project Arborist inspect and approve tree protection barriers prior to the start of any clearing/grubbing, demolition, site preparation, or construction works;
- Ensuring the Project Arborist first review, approve, and monitor any and all work required within identified TPZs of retained trees;
- Using hydrovac (or similar) excavation procedures for any approved excavation works within the TPZs of retained trees, and ensuring works are monitored by the Project Arborist;
- Ensuring any required and approved root pruning within TPZs of a retained tree follows International Society of Arboriculture standards and is monitored by the Project Arborist;
- Summarizing all monitoring data and observations, including photo documentation, in monitoring inspection reports, as needed, and providing the reports to all interested parties (e.g., MOTI, Ministry of Forests, contractors); and
- Ensuring the tree protection barrier remain in place until written approval is received by the Project Arborist to either a) relocate to accommodate specific work activities, or b) remove completely (i.e., upon completion of the project with no further work scheduled).

5.0 CLOSING

Impacts from the flooding events appeared to be most significant at the Kenyon Creek Site. At this time, mitigation is only recommended for trees at the Kenyon Creek Site. Suggested mitigation measures are summarized in Table 1 (attached). No mitigation actions are recommended for the Gough Creek and Clack Creek Sites; however, it is recommended that tree vitality be monitored over the next two growing seasons to assess the potential for less-immediate impacts and potential mortalities due to rot disturbance, soil compaction, and/or prolonged inundation.

6.0 STATEMENT OF LIMITATIONS AND CONDITIONS FOR REPORT

6.1 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 PGL by the Client, communications between PGL and the Client, and any other reports, proposals or documents prepared by PGL for the Client relative to the specific site described herein, all of which together 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. **PGL is not responsible for use by any part of portions of the Report without reference to the whole report.**

6.2 Basis of Report

The Report has been prepared for the specific site and purposes that are set out in the contract between PGL and the Client. The findings, recommendations, suggestions, or opinions expressed in the Report are only applicable to the site and purposes in relation to which the Report is expressly provided, and then only to the extent that there has been no material alteration to or variation from the information provided or available to PGL.

6.3 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 PGL's written consent, and such use shall be on terms and conditions as PGL may expressly approve. Ownership in and copyright for the contents of the Report belong to PGL. Any use which a third party makes of the Report, is the sole responsibility of such third party. **PGL accepts no responsibility whatsoever for damages suffered by any third party resulting from use of the Report.**

7.0 CLOSING

We trust that this meets your needs. If you have any questions or require clarification, please contact Stewart Brown or Katharine Scotton at 604-895-7612 and 604-235-8021, respectively.

PGL ENVIRONMENTAL CONSULTANTS

Per:



Keven Goodearle, B.Sc., R.P.Bio.
Senior Environmental Consultant
ISA Certified Arborist (PN-6291A)



Stewart Brown, M.Sc., P.Ag., R.P.Bio.
Lead Consultant

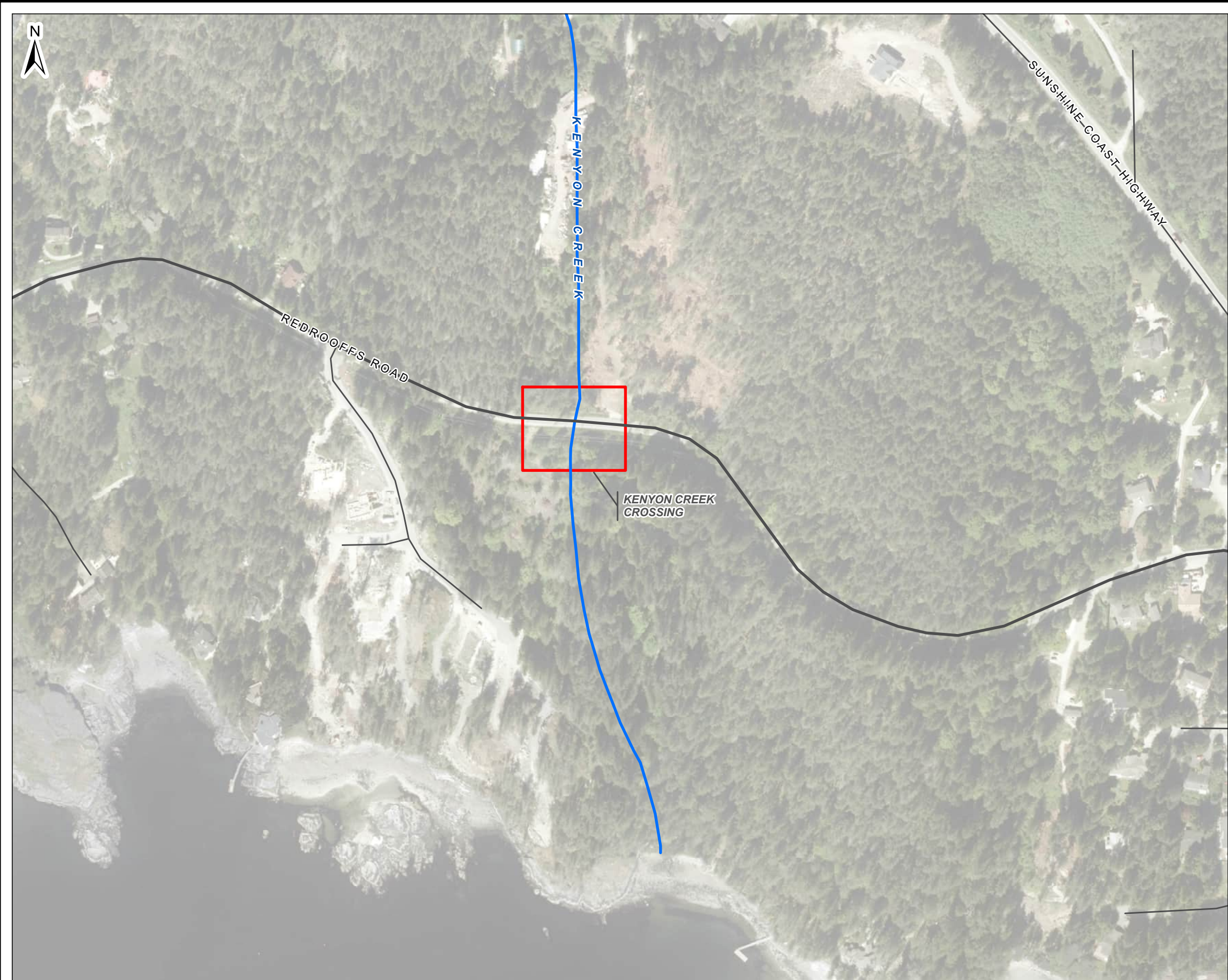
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Attachments: Figures
Table
Appendix A: Site Photographs

Figures

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Parcel boundary and site features are approximate and are presented for discussion purposes only.

2021 orthoimage and street map from ESRI
Road and watercourse data from BC Open Data
NAD 1983 UTM Zone 10N



0 5 Km

- Subject Site
- Road Centreline
- Watercourse

SITE LOCATION: KENYON CREEK SITE			
Kenyon Creek Crossing at Redrooffs Road, Sechelt, BC			
MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE			
	File No.:	Dwg No.:	FIGURE 1
	0346-65.01	AR_0010	
Date:	FEB 2023	Drawn by:	RSS



Parcel boundary and site features are approximate and are presented for discussion purposes only.

0 1:3,000 160 m

2021 orthoimage and street map from ESRI Road and watercourse data from BC Open Data NAD 1983 UTM Zone 10N



0 5 Km

- Subject Site
- Road Centreline
- Watercourse

SITE LOCATION: GOUGH CREEK SITE AND CLACK CREEK SITE

Gough Creek Crossing & Clack Creek Crossing
at Day Road, Roberts Creek, BC

MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE



File No.:	Dwg No.:	FIGURE
0346-65.01	AR_0020	
Date:	Drawn by:	2
FEB 2023	RSS	

Table

**Table 1
Arborist Report
Tree Risk Assessments
PGL File: 0346-65.01**

Tag #	Tree Code	Common Name	Scientific Name	dbh (cm)	Est. Height (m)	General Comments and Condition(s) of Concern	Target Description ¹	Risk Assessment ²					Risk Mitigation Recommendations	Recommended Timing
								Likelihood of Failure	Likelihood of Impact	Likelihood of Failure & Impact	Consequences of Failure	Overall Risk Rating		
328	Dr	red alder	<i>Alnus rubra</i>	17.5	17	- Mid-bank on NE side with erosion evident around creek side of base. - Wound on W side of tree; no advanced decay at time of field review. - Eutrophic swoop to NE in upper portion of main stem. - Appeared to be in good health and stable at time of field review. - Photographs 1 and 2.	- Redroofs Road - Construction workers and equipment during remedial works	Possible	High	Somewhat Likely	Significant	Moderate	Convert to wildlife stem ~3m above grade to mitigate long-term risk and possible conflict with remedial works	Prior to commencement of construction
329	Cw	western redcedar	<i>Thuja plicata</i>	41	24	- In decline, most likely due to recent extreme heat/drought conditions in addition to flood disturbance and erosion. - Some roots exposed from erosion/flooding event. - Otherwise, appeared stable at time of field review. - Photographs 2 through 4.	- Redroofs Road - Construction workers and equipment during remedial works	Improbable	High	Unlikely	Severe	Low	Retain and monitor, unless in conflict with remedial works	N/A
330	Cw	western redcedar	<i>Thuja plicata</i>	39, 57, 39	24	- x3 codom stems with union at grade. - Growing out of creek bank and undercut. - Erosion from flooding event evident around base of tree. - Recent wounds on middle of stem; no advanced decay apparent. - All three stems were in decline, most likely due to recent extreme heat/drought conditions in addition to flood disturbance and erosion. - Photographs 2, 5 and 6.	- Redroofs Road - Construction workers and equipment during remedial works	Possible	High	Somewhat Likely	Severe	Moderate	Convert to wildlife stems ~3-4m above grade to mitigate risks (short and long-term)	Prior to commencement of construction
231	Dr	red alder	<i>Alnus rubra</i>	45	20	- x2 codom stems with union ~0.5m above dbh. - Included bark observed at union. - In decline with dieback evident in canopy. - Mid-slope with significant erosion around base of tree. - Eutrophic, self-corrected lean to west (over road). - Recent wounds on main stem; no advanced decay evident. - Pithing at base of tree observed. - Photographs 7 through 9.	- Redroofs Road - Construction workers and equipment during remedial works	Probable	High	Likely	Severe	High	Remove to mitigate risks and eliminate conflicts with remedial works	Prior to commencement of construction
232	Mb	bigleaf maple	<i>Acer macrophyllum</i>	26	20	- Standing dead; failed to leaf-out in 2022 growing season (may have been deceased prior to flooding event - timing uncertain). - Growing out of historically failed tree (nurse log). - Slight lean to northwest. - Likely direction of failure, should it occur, would be upstream and away from road. - Photograph 10 and 11.	- Redroofs Road - Construction workers and equipment during remedial works	Probable	Medium	Somewhat Likely	Severe	Moderate	Remove to mitigate risks and eliminate conflicts with remedial works	Prior to commencement of construction

**Table 1
Arborist Report
Tree Risk Assessments
PGL File: 0346-65.01**

Tag #	Tree Code	Common Name	Scientific Name	dbh (cm)	Est. Height (m)	General Comments and Condition(s) of Concern	Target Description ¹	Risk Assessment ²					Risk Mitigation Recommendations	Recommended Timing
								Likelihood of Failure	Likelihood of Impact	Likelihood of Failure & Impact	Consequences of Failure	Overall Risk Rating		
233	Cw	western redcedar	<i>Thuja plicata</i>	29	14	- Partial, historical failure, then self-corrected. - In significant decline (dieing; foliage turning brown). - Lean to southeast; towards newly installed culvert. - Leaning into Trees #236 and 237. - Photograph 12.	- Redroofs Road - Construction workers and equipment during remedial works	Probable	Medium	Somewhat Likely	Significant	Moderate	Remove to mitigate risks and eliminate conflicts with remedial works	Prior to commencement of construction
234	Mb	bigleaf maple	<i>Acer macrophyllum</i>	16.5	5	- Standing dead. - Previously topped tree. - Growing into tree #235 (top cut above junction with this tree). - Lean to southeast; towards road. - Photographs 13 and 14.	- Redroofs Road - Construction workers and equipment during remedial works	Possible	Medium	Unlikely	Significant	Low	Convert to wildlife stem ~3-4m to above grade reduce long-term risks	Prior to commencement of construction
235	Mb	bigleaf maple	<i>Acer macrophyllum</i>	25	18	- Standing dead. - Erosion at base of tree with new material added. - Lean to southeast; towards road. - Photographs 13 and 14.	- Redroofs Road - Construction workers and equipment during remedial works	Probable	High	Likely	Severe	High	Convert to wildlife stem ~3-4m above grade to reduce risks	Prior to commencement of construction
236	Dr	red alder	<i>Alnus rubra</i>	24	18	- Some dieback in canopy; low vitality. - Lean towards road. - Some material and sediment accumulation at base of tree; buried root collar. - Tree #233 leaning into 236. - Photographs 15 and 16.	- Redroofs Road - Construction workers and equipment during remedial works	Possible	High	Somewhat Likely	Severe	Moderate	Convert to wildlife stem ~3-4m above grade to reduce risks	Prior to commencement of construction
237	Dr	red alder	<i>Alnus rubra</i>			- Some dieback in canopy; low vitality. - Lean towards road. - Some material and sediment accumulation at base of tree; buried root collar. - Tree #233 leaning into 237. - Photograph 16.	- Redroofs Road - Construction workers and equipment during remedial works	Possible	High	Somewhat Likely	Severe	Moderate	Convert to wildlife stem ~3-4m above grade to reduce risks	Prior to commencement of construction
238	Hw	western hemlock	<i>Tsuga heterophylla</i>	56	28	- In significant decline with dieback evident throughout canopy. - Significant amount of material/sediment accumulation around base of tree potentially suffocating roots. - Very slight, eutrophic swoop in upper portion of main stem to south; towards road. - Photographs 17 and 18.	- Redroofs Road - Construction workers and equipment during remedial works	Possible	High	Somewhat Likely	Severe	Moderate	Convert to wildlife stem ~3-4m above grade to reduce risks	Prior to commencement of construction

Notes:

1) Listed targets are estimated to be within 1.5 x tree height, unless noted otherwise.

2) Risk assessment completed using a Level 2: Basic Assessment Process outlined in the ISA *Tree Risk Assessment Manual, 2nd ed.* (Dunster, J. et al., 2017). Risk assessment based on existing site conditions/land uses, our current understanding of the proposed subdivision plan, and two-year assessment period.

Appendix A
Site Photographs



Photograph 1:

Bank erosion around base of Tree #328



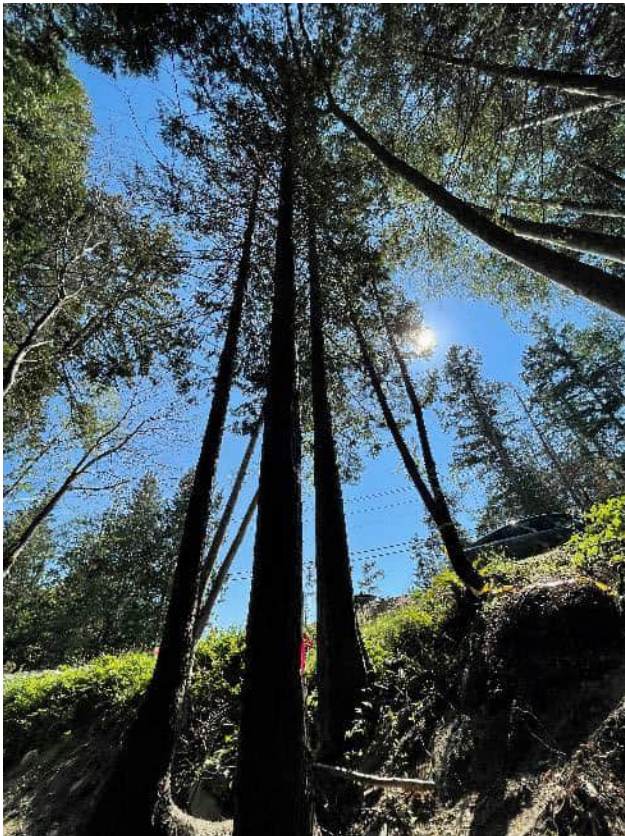
Photograph 2:

Showing Trees #328, #329, #330, and #231, as well as additional red alder tree requiring removal



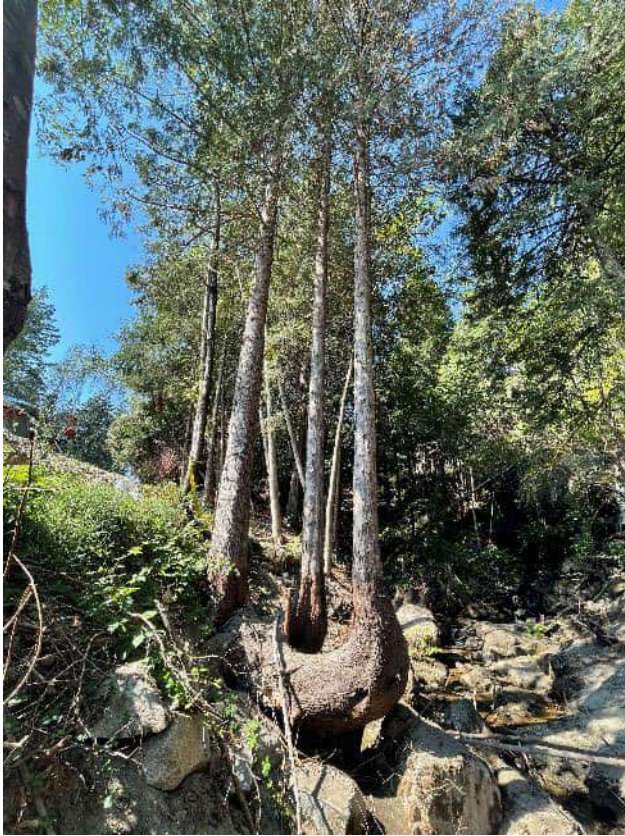
Photograph 3:

**Showing erosion disturbance
around base of Tree #329**



Photograph 4:

Thinning canopy in Tree #329



Photograph 5:

Triple-stemmed Tree #330 with thinning canopy and erosion around base of tree



Photograph 6:

Erosion and undercut bank below Tree #330



Photograph 7:

**Included bark at codom union
of Tree #231 with recent
wound**



Photograph 8:

**Showing significant erosion
around base of Tree #231**



Photograph 9:

**Showing dieback in upper
canopy of Tree #231**



Photograph 10:
**Standing dead bigleaf maple
(Tree #232)**



Photograph 11:
**Tree #232 growing from nurse
log**



Photograph 12:

**Partially failed and recently
dead or in significant decline
Tree #233**



Photograph 13:

**Topped and dead Tree #234
growing into standing dead
Tree #235**



Photograph 14:

**Topped and dead Tree #234
growing into standing dead
Tree #235**



Photograph 15:

Buried base of Tree #236



Photograph 16:

**Upper canopies of Trees #236
and #237 in decline**



Photograph 17:

**Significant dieback in
Tree #238**



Photograph 18:

**Significant material
accumulation around the base
of Tree #238**



Photograph 19:

**Showing un-inventoried tree
north of Tree #328 with fungal
fruiting bodies requiring
removal**



Photograph 20:

Tree resources downstream of Redroofs Road showing minor impacted trees



Photograph 21:

Trees outside of disturbance area on downstream side at Gough Creek Site



Photograph 22:

**Buried red alder trees on
upstream side of road at
Gough Creek Site**



Photograph 23:

**Buried red alder trees on
upstream side of road at
Gough Creek Site**



Photograph 24:

**Buried red alder trees on
upstream side of road at
Gough Creek Site**



Photograph 25:

**Showing good vitality in buried
red alder trees on upstream
side of road at Gough Creek
Site**



Photograph 26:

Showing young deciduous stand on upstream side of Day Road (left) at Clack Creek, and coniferous stand on downstream side (right)



Photograph 27:

Showing washed-out culvert and downed trees downstream of Day Road at the Clack Creek Site



Photograph 28:

Stand canopy downstream of Day Road at Clack Creek showing good vitality



Photograph 29:

Showing minimal disturbance on upstream side of Day Road at the Clack Creek Site



Photograph 30:

Showing minor erosion and root exposure on west side of Clack Creek upstream of Day Road



Photograph 31:

Showing good vitality in forest stand on upstream side of Day Road at the Clack Creek Site