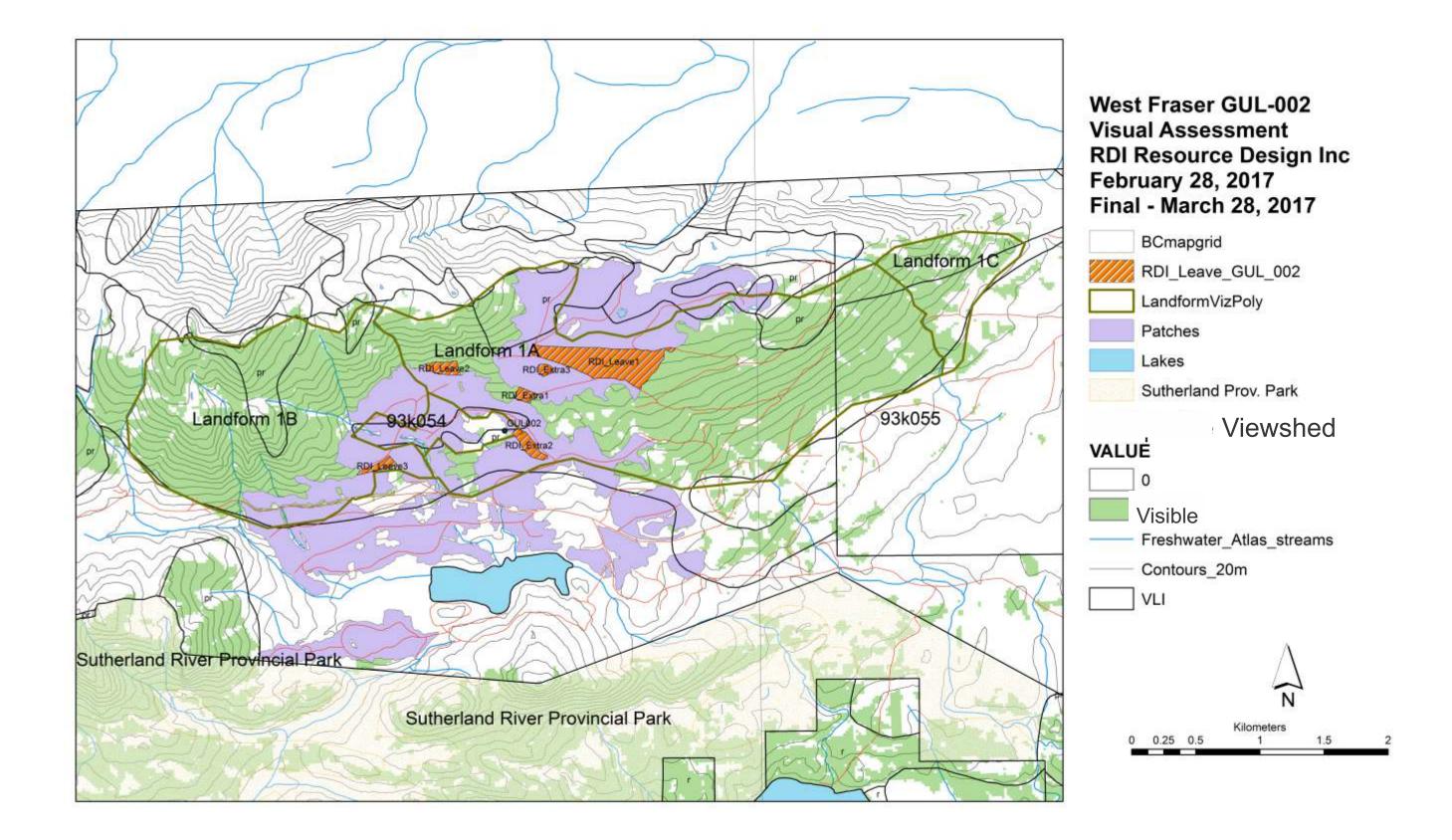


Final 170328



1	Key Map
2	Contents
3	Summary and Conclusions
4	FREP Visual Quality Protocol
5	Sutherland Shore Viewpoint - Original Layout
6	Sutherland Shore Viewpoint - Original Layout - Percent Alteration
7	Sutherland Shore Viewpoint - RDI Leave #1 Only
8	Sutherland Shore Viewpoint - RDI Leave #1 and All - Percent Alteration
9	Sutherland Mid and North Viewpoints - Original Layout
10	Sutherland Mid and North Viewpoints - RDI Leave #1 Only
11	RDI 3 Viewpoint with RDI #1 Leave Only
12	RDI 3 Viewpoint - Percent Alteration - Original Layout and with All RDI Leav
13	4-Mile Shore Viewpoint - Original Layout
14	4-Mile Shore Viewpoint - Original Layout - Percent Alteration
15	4-Mile Shore Viewpoint - RDI Leave #1
16	4-Mile Shore Viewpoint - RDI Leave 1 and Leave All - Percent Alteration
17	4-Mile Mid and North Viewpoints - Original Layout
18	4-Mile Mid and North Viewpoints - RDI Leave #1
19	RDI Viewpoints 1 to 9 with RDI Leave #1 Only

West Fraser's GUL-002 is proposed to be a cutblock initiated primarily due to beetle-infestation / kill. RDI was requested by Jaret van der Giessen to conduct a visual assessment of the proposal and make recommendations to ensure the Visual Quality Objective (VQO) of Partial Retention can be achieved. The full database was provided by West Fraser, including their Visual Nature Studio (VNS) 3-dimensional software project to facilitate comparable analyses.

Four viewpoints were provided by West Fraser - two in the Sutherland Creek end of Babine Lake, and two 8 kilometres west at 4-Mile Creek. These viewpoints were the primary analysis viewpoints employed by RDI. Each set provided a nearshore view and a mid-channel view towards GUL-002. The near-shore viewpoints offered the best viewing opportunities. The visible portions of GUL-002 are 3 km to 4 km from the north shore of Babine Lake, and 6 km (middleground) to 9 km (background) from the south shore viewpoints.

RDI ran its own VNS simulations for verification, analysis and design intervention trials using the West Fraser VNS project. RDI also created a visibility analysis built with forest-height-adjusted terrain, and ran a cumulative viewshed from the primary viewpoint together with an additional 9 viewpoints aligned along the south-side of the lake between 4-Mile and Sutherland. As well, an additional "north" viewpoints were added closer to the north shore of the lake end for greater confirmation of visibility (or its diminishment approaching the north-shore). Single VNS camera renderings were prepared from each of the viewpoints using a 38.58 degree field of view which equates in VNS to a 50mm camera lens. This lens is considered to replicate normal human viewing without vertical exaggeration or diminishment although restricted in width by the camera frame. The eye can grasp approximately 110 degrees width of view, although detailed (foveal) vision requires some movement of the eye of head for focus. This is a natural way humans perceive their surroundings, in an additive way. The surrounding visual experience is important when assessing a particular proposal, therefor full panoramas were ran from the Sutherland and 4-Mile viewpoints.

RDI identified the relevant Landform 1A containing GUL-002 using the viewshed and simulations. The landform is separated from the frontal landscape by a low area containing a lake in the gap of over 1 km in depth away from the viewpoints. Though the central back landform containing GUL-002 initially was broader in delineation, RDI determined that creeks near each end suggested breaks should be made to form 1B to the west (281 ha) and 1C to the east (58 ha). The central landform 1 is 487 hectare in area, and sits behind the dominant first height of land along the north-side of the east end of Babine Lake. This frontal landform is the lake-side portion of Sutherland River Provincial Park. As well, there are several small parcels of private land within the park envelope along the shore.

Visibility of GUL-002 and the landform containing it varies greatly over a 10 km stretch of the lake approaching Sutherland River. The intervening hills of Sutherland Park screen nearly half of the 438 hectare GUL-002 fully, and provide glimpses to varying portions of the cutblock progressing between 4-Mile and Sutherland viewpoints. The mid-lake and north side views show a rapid diminishment in apparency of the cutblock and the landform containing it.

There is another large cutblock proposed by West Fraser, GUL-005, which will be over 2 km distant at its closest point from GUL-002. The cutblock will not be visible from any of the GUL-002 viewpoints as it sits largely in a broad upper flat behind the lake-side landforms which are within the provincial park boundary, and roughly 3 km to 6 km away from the lake's northern edge.

A FREP Visual Quality Protocol analysis was prepared by RDI for 3 viewpoints - Sutherland Shore, RDI 3, and 4-Mile Shore. The results are presented on the following page. The findings indicate that the proposed alteration of GUL-002, with the three suggested RDI leave patches, have the capability of meeting the VQO of Partial Retention from 2 of the 3 viewpoints analyzed. 4-Mile Shore does not yet meet the VQO although further leave patches could be designed to reduce the adjusted Percent Alteration down to 7% from the 8.5% adjusted value as presently calculated. RDI did not pursue further reductions at this time as the slice of landform on which GUL-02 sits is too constrained by the large frontal landforms to make Percent Alteration a valid calculation. As well, the intent to harvest the maximum possible beetleinfested / killed timber suggests additional leave beyond that already identified by RDI could be considered by forest managers to be silviculturally inappropriate.

RDI has not yet had the opportunity for an on-site visit as of this report date. FLNRO considers on-site familiarity to be essential for the reliability of professional analysis.

Ken B. Fairhurst, PhD, RPF

RDI Resource Design Inc February 28, 2017

Ka B. Jan Junt

	RDI analysis of GUL-002 in Landforms #1A with RDI Suggested Leave	Mapsheet: 093K054; South	-east Babine Lake Noi	rth side; Polygon 219	); VSU 12; VSC 3; D	ate: 2010	
2.2.1	Viewpoint	Sutherland Shore	4-Mile Shore	RDI 3			
2.2.2	Viewpoint Importance: sustained focal view travelling towards > 1 minute	2	2	2			
	Basic VQC visual assessment prior to measurement (see description below)	Partial Retention	Partial Retention	Partial Retention			
2.2.4	Design Observationsith rating guide: see http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/visual-resource-mgmt/monitoring-vrm/vrm_protocol_for_visual_quality_effectiveness.pdf and http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/visual-resource-mgmt/monitoring-vrm/vrm_vqe_evaluation_form.pdf	G (-1), M (0), P (+1)	G (-1), M (0), P (+1)	G (-1), M (0), P (+1)			
1	Does the alteration respond to major lines of force?	-1	-1	-1			
2	Does the alteration borrow from the natural character of the landscape?	-1	-1	-1			
3	Have edge treatments been incorporated?	0	0	0			
4	How far is the alteration from the viewpoint? FG<1km: Poor (+1), MG1-8km: Mod. (O), BG>8: Good (-1)	0	-1	0			
5	What position does the alteration occupy on the landform? G (-1), M (0), P (+1)	0	1	-1			
	Total Design (2.2.4)	-2	-2	-3			
2.32	Assess Percent Alteration Landform #1: Initial*	4.59%	4.75%	5.60%			
	Initial VQC	PR	PR	PR			
.3.3	Assess Adjusted VQC						
d.	Impact of roads: none (0), subordinate (1), Significant (2), dominant (3)	1	1	1			
€.	Tree retention: P (<15%)=0, M (15 to 22%)=-1, G (>22%)= -2	0	0	0			
f.	Total Design (from 2.2.4)	-2	-2	-3			
	Y=sum 2.2.4+sum 2.3.3	-1	-1	-2			
	Adjusted Percent Alteration = X*(1+0.14Y)	3.95%	4.09%	4.03%			
	Adjusted VQC	Partial Retention	Partial Retention	Partial Retention			
.3.6	EE Rating for the Landform comparing Basic and Adjusted VQC	Met	Met	Met			
.3.7	Allowance for Over-ride: Over-ride EE	n/a	n/a	n/a			
	*Note: Viewpoint RDI3 Percent Alteration is for Combined L	andform 1A + 1B. 1A alou	ne is 7.1%. When ap	plied, Adjusted % A	It is 5.11% and E	E rating is Border	line
2.2.3	characteristics. The landform containing GUL-002 is isolated from the vastly dominant landforms along the shore (Sutherland River Provincial Park) by a flat of over 1000m containing a lake, placing it in either far middleground or near background as seen from the viewpoints. As well, the frontal landforms obscure visibility and scale of Landforms 1A, B, and C, varying along a 10 km stretch of viewing opportunity. For example, Landform 1A is just 4.3% of the viewable land area in perspective view contained within the single 50mm 38.6 degree FOV VNS camera view as seen from the 4-Mile Shore viewpoint (a "gun-sight" view). People will naturally scan the much broader and ineresting landscape while assessing this tiny component. The main landscape is 110 degrees FOV or approx. 3 5 camera shots wide from this viewpoint, which would be easily scanned with eye or head movement. Landform 1A is approximately 10% of this width and under 2% of the mass in camera view compared to the park's main frontal landscape.						
2.4.2	Force Lines. RDI has rated force lines as potentially good (-1) within and adjacent to the cutblocks in Landform #1A and 1B. RDI's recommended reserves greatly strengthen visual force, particularly along the skyline. The FLNRO process is limited by definitions - force lines are either strong (G) or weak (P) with no middle ground for some response to force lines except "no force lines evident".  Natural Character. Openings borrow from the overall natural landscape character and therefor is rated as Good (-1). Existing character has existing older greened-up and nonVEG alteration. The new openings emulate "the quality of shapes found in the landform - rounded, curvilinear on rounded landforms; spiky more jagged shapes in more rugged terrain".						
.2.4.3	Edge Treatments. Boundaries of openings and leave patches within are irregular					uire feathering alor	na edaes.
	Distance from the Sutherland Shore Viewpoint closest to GUL-002 is 5-6 km Moderate - 0 (5-6 km), RDI 3 is similar and 4-Mile shore is background (Good -1).						

are moderate to good. GUL-002 in Landform #1A varies from low to middle height on the landform and to itsleft side with varying sizes ranging from small to medium. RDI has rated position as Poor (+1)

Impact of roads is potentially subordinate (+1) to significant (+2), except from Viewpoint 1A where they will be likely be fully subordinate (+1). RDI has rated them as subordinate if seen at all from the

Tree retention was considered poor as planimetrically it appears that retentionis less than 15% (subject to confirmation by FLS). There may be opportunity for selective tree removal within the RDI leave

EE Rating for the Landform comparing Basic and Adjusted VQC. Well Metboth methods indicate VQO acheivement and are on the lower % alteration limit or mid-range of the class (1.5% to 4.25% for

2.2.4.5 from 4-Mile Shore as the block occup[ies the full width of the truncated landform due to the dominant intervening landforms along the shore. RDI does not consider 4-Mile Shore to be a valid analysis

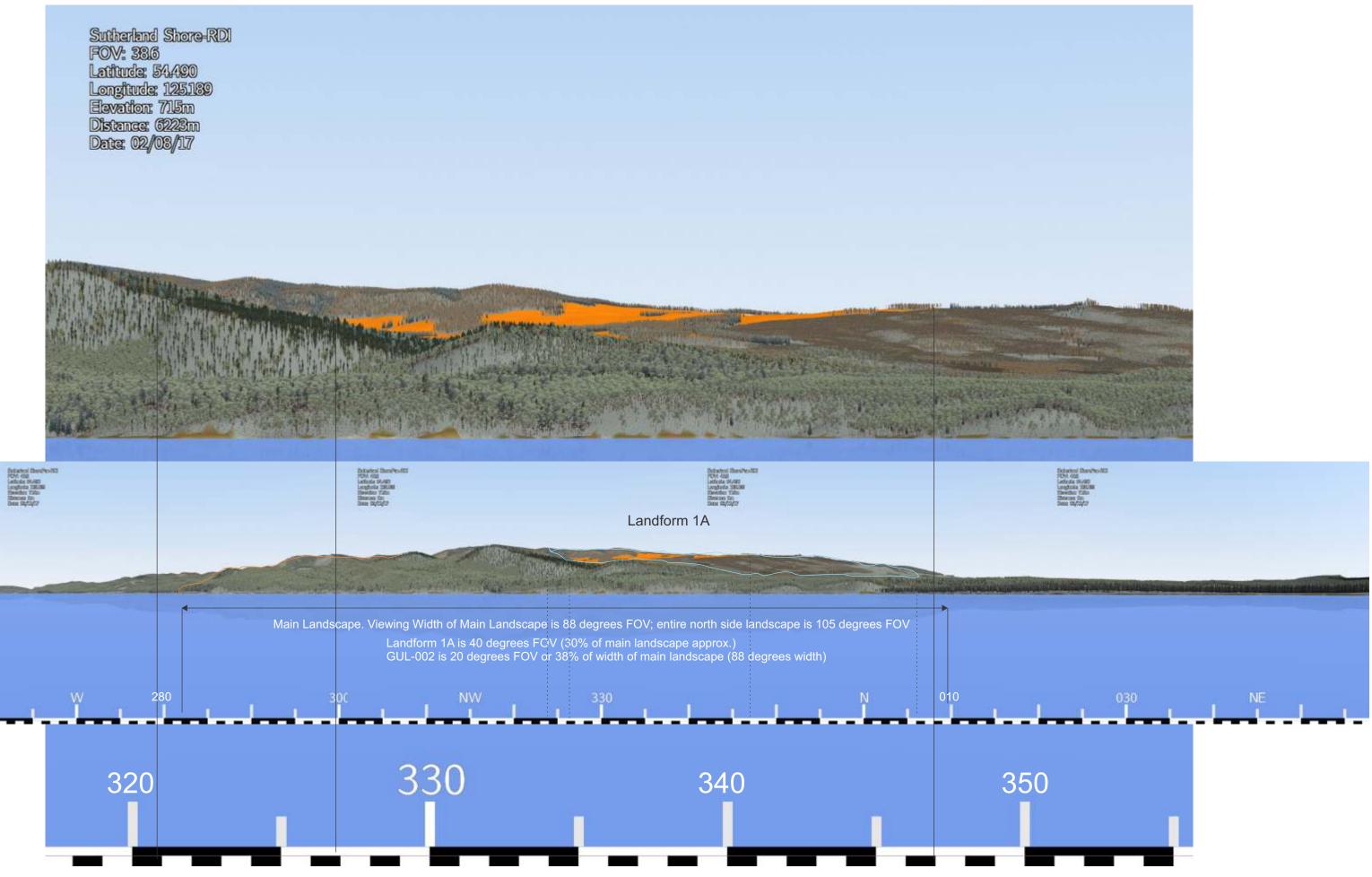
PR). Met: both methods indicate VQO achievement but one or both are close to the high end "maximum % alteration limit (7% for PR)".

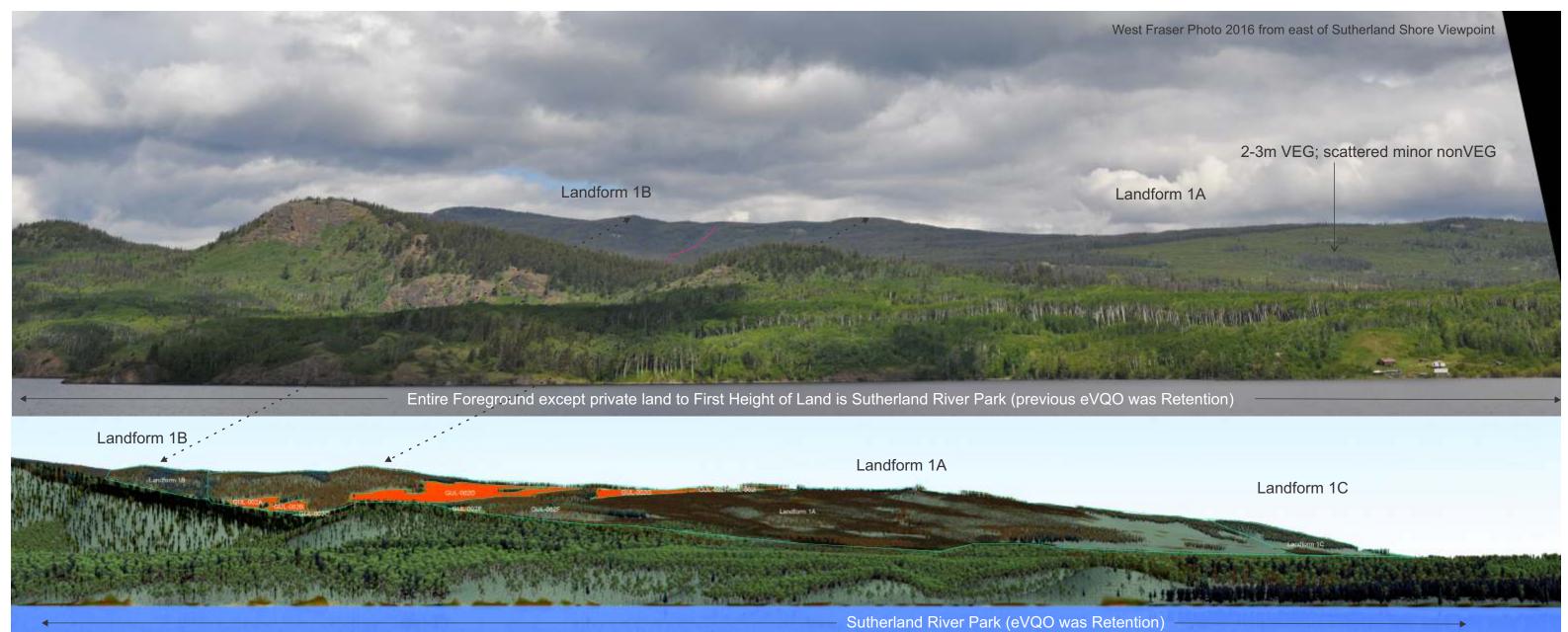
viewpoint due to severe truncation.

2.3.3-d

2.3.3-e

5





Framed Simulation Land Area - 38.58 deg. FOV (50mm lens)

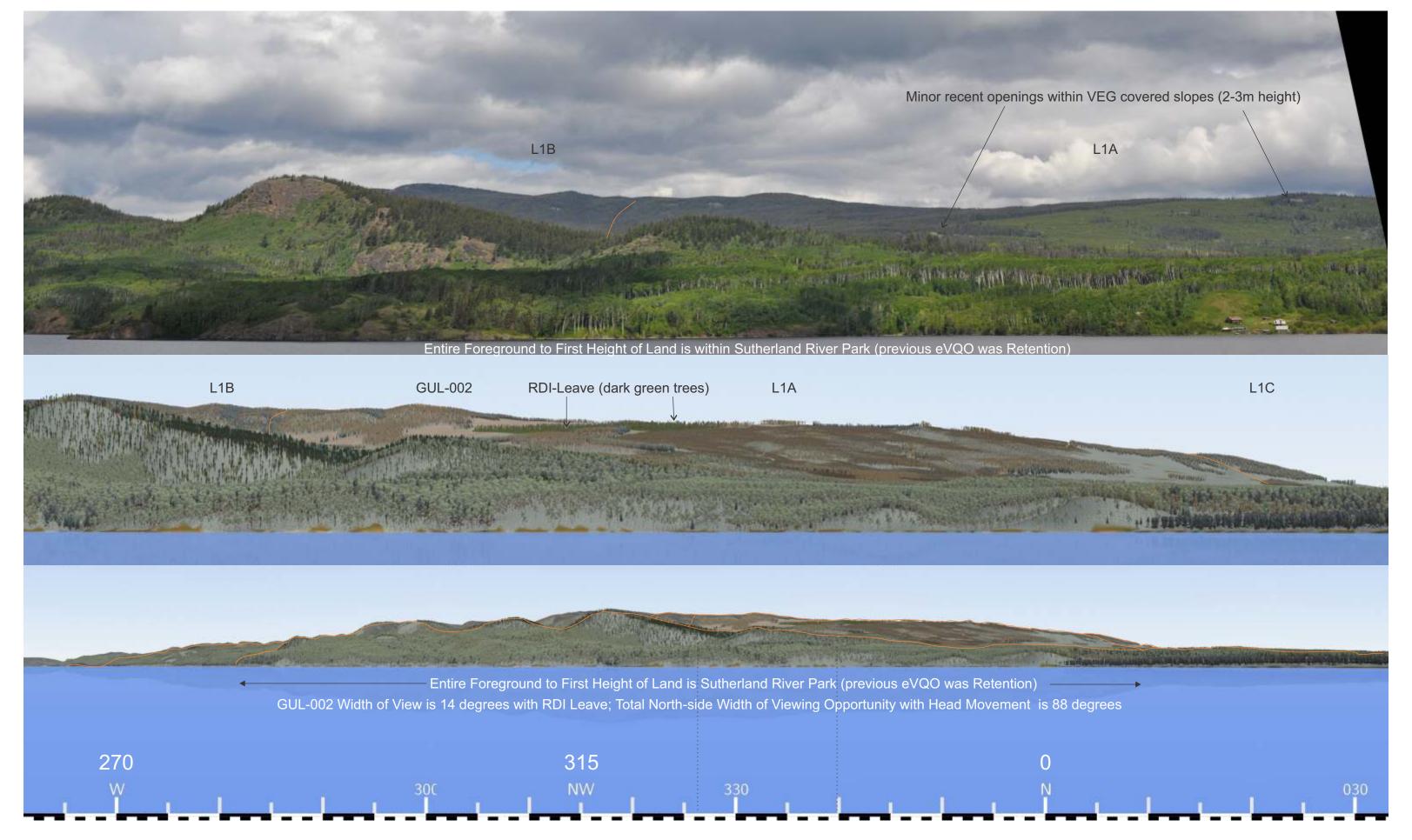
Landform 1A is broad without some differentiation in the skyline towards the left side. It is located between two end landforms (1B and 1C). These ends are separated from the main landform 1A by creeks as indicated on the key map (page 1) and subtle skyline breaks. The proposed alteration is located below some steeper terrain on the left side of the landform. The proposed opening relates well with existing pattern of 2-3m VEG alterations in the centre of the landform and more substantial 4m+ VEG on the right side.

The new alteration as originally proposed is somewhat large within its landform, meeting a Modification VQC. As such RDI has designed a 20 ha leave patch to reduce scale (see subsequent pages).

Viewing distance is 5.6 km to 6.2 km (middleground). The landform diminishes the closer one gets travelling towards it, as evidenced from the "Mid" and "North" views on the "other" Sutherland views page. Travelling close to the southern shore from this far eastern end of Babine Lake, the intervening landforms variously screen and expose parts of GUL-002 at right angles or tangential to the travel direction over a course of approximately 10 km, including the view from 4-mile addressed in this report, and 2 km beyond. This Sutherland Shore Viewpoint is considered by RDI to be the best-opportunity / worst-case viewpoint.

## Percent Alteration Sutherland Shore Viewpoint - GUL-002 Outsing Coable at Diam

Original Cutblock Plan			
Name_1	AREA	% Alt	
Landform 1A	86372.80		
GUL-002A	625.86	0.72%	
GUL-002B	614.63	0.71%	
GUL-002C	150.47	0.17%	
GUL-002D	4670.29	5.41%	
GUL-002E	137.56	0.16%	
GUL-002F	37.01	0.04%	
GUL-002G	968.80	1.12%	
GUL-002H	22.84	0.03%	
GUL-002I	104.57	0.12%	
Sum Alt	7332.04	8.49%	
Landform 1B	4254.88		
Landform 1C	4754.95		



Sutherland Shore Viewpoint - Cutblock Plan with RDI Suggested Leave #1 only

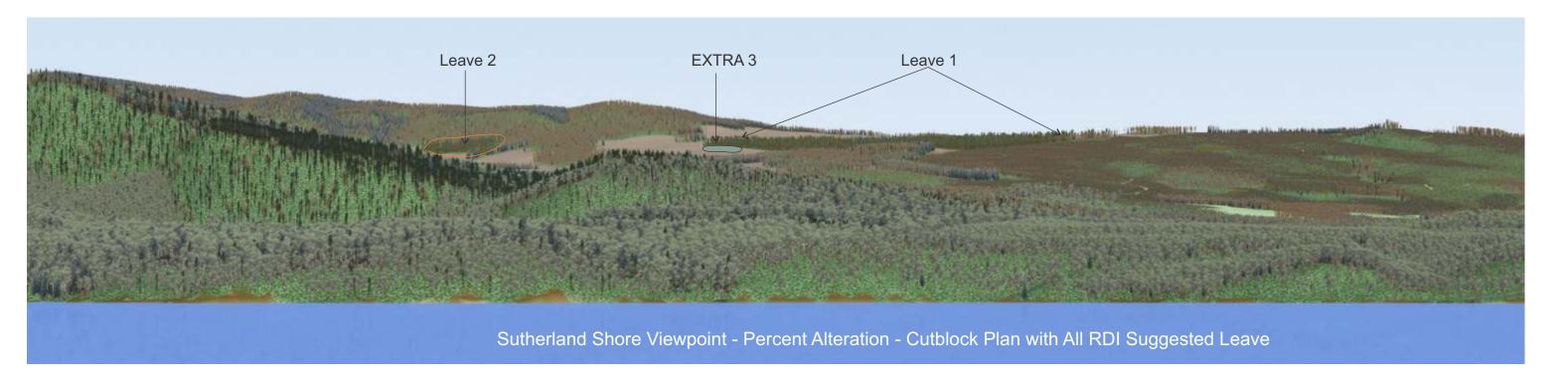


Percent Alteration Sutherland Shore Viewpoint - RDI Leave			
Name_1	AREA	% Alt	
Landform 1A	333069.13		
GUL-002A	2616.48	0.79%	
GUL-002B	2033.25	0.61%	
GUL-002C	422.57	0.13%	
GUL-002D	11062.79	3.32%	
GUL-002E	524.25	0.16%	
GUL-002F	357.72	0.11%	
GUL-002G	275.09	0.08%	
Sum Alt	17292 16	5 19%	

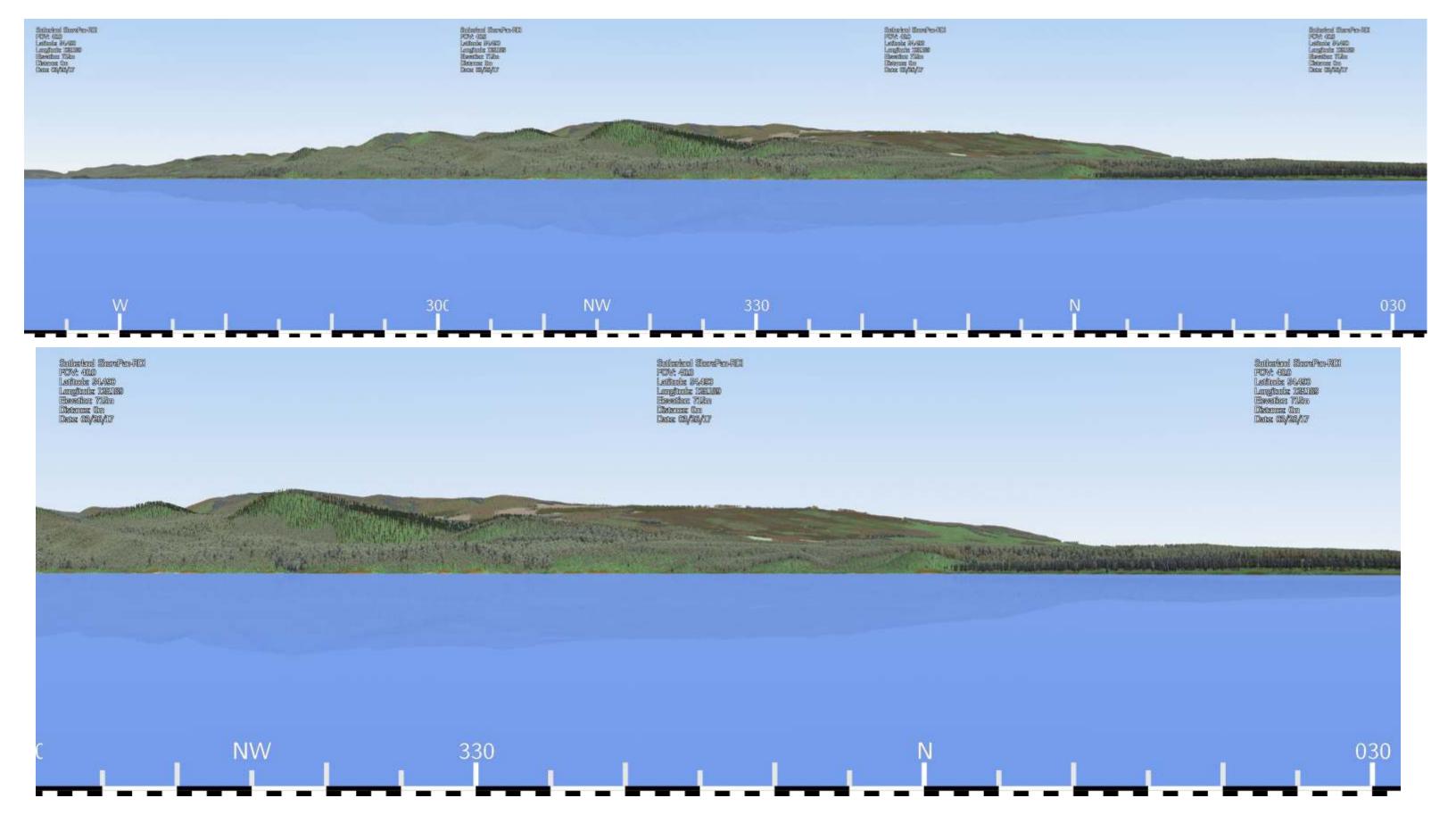
Leave 2 AND EXTRA 3 - delete additional 0.6% - Total 4.59%

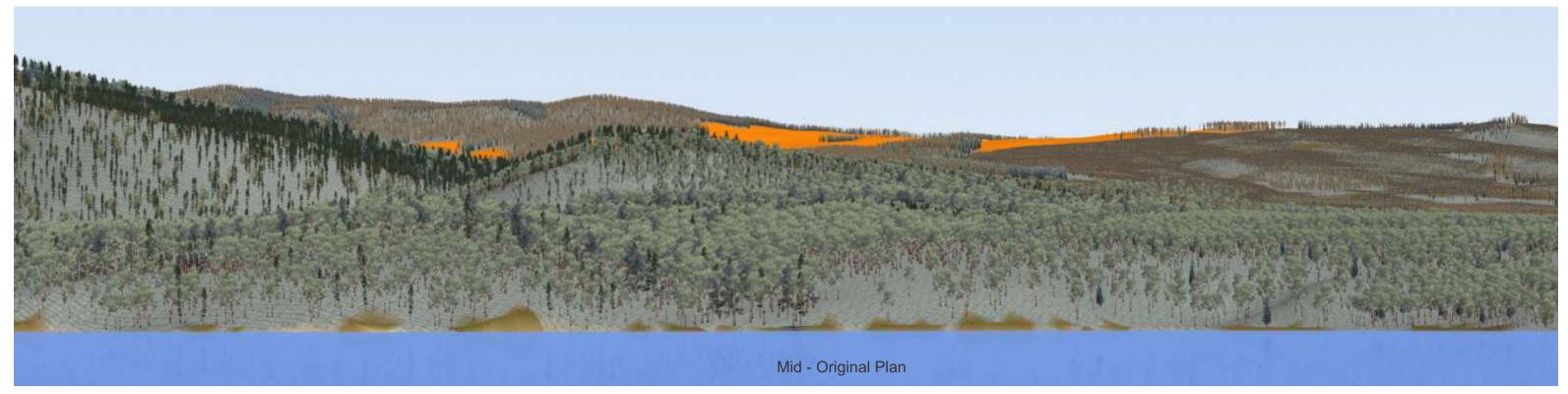
Landform 1A is broad without some differentiation in the skyline towards the left side. It is located between two end landforms (1B and 1C). These ends are separated from the main landform 1A by creeks as indicated on the key map (page 1) and subtle skyline breaks. The proposed alteration is located below some steeper terrain on the left side of Landform 1A. The RDI suggested leave patch will create a greater balance within the landform. The proposed cutblock together with the suggested RDI leave will relate well to existing pattern of 2-3m VEG alterations in the centre of the landform and more substantial 4m+ VEG on the right side. The RDI patch is approximately 20 ha in extent, and is located adjacent to roads to allow easy future utilization. The RDI patch solidifies the skyline, and reduces scale of alteration (a reduction of 3.3%), bringing the landform into mid-Partial Retention VQC.

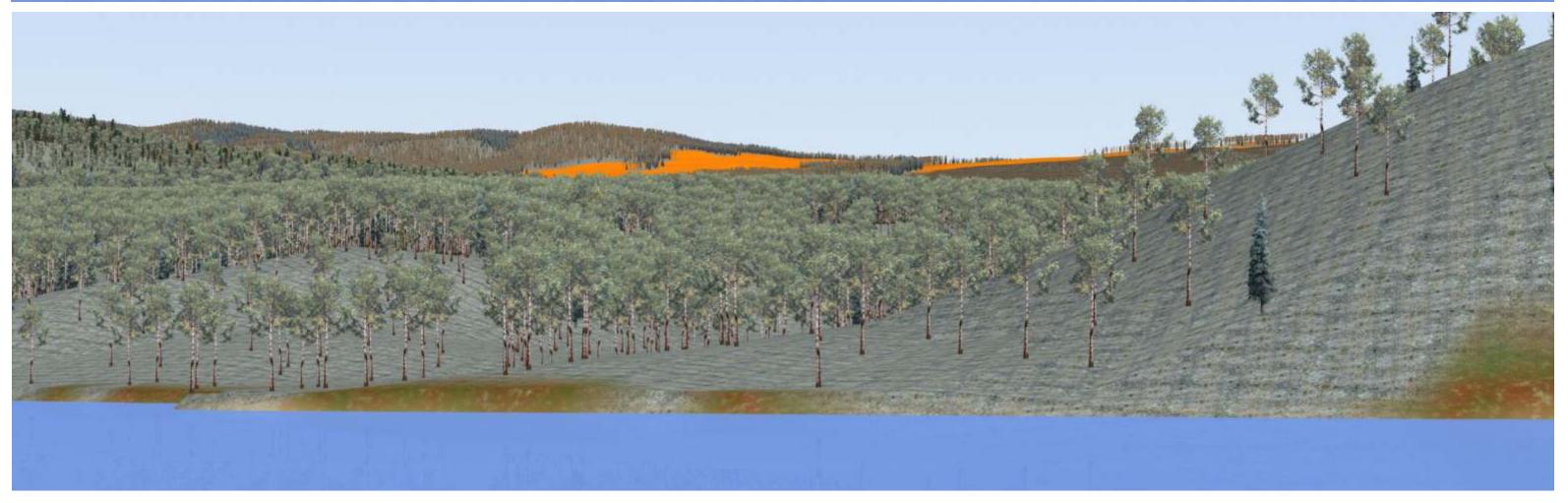
The new alteration with the RDI leave patch will be subordinate within its landform, is capable of meeting the Partial Retention VQO in Landform 1A, and will be very subordinate in the overall scene which is dominated from end-to-end by the lakeside portions of Sutherland River Park (see previous page for full width). There is the opportunity to carry out some partial cutting within the leave patch, however, RDI defers to appropriate silvicultural requirements if that is to be carried out. RDI also placed two leave areas in Landform 1A. They reduced the Percent Alteration by 0.6% to 4.59%, well-meeting Partial Retention VQO. The extra leave area is also important when viewed from the RDI 3 viewpoint.



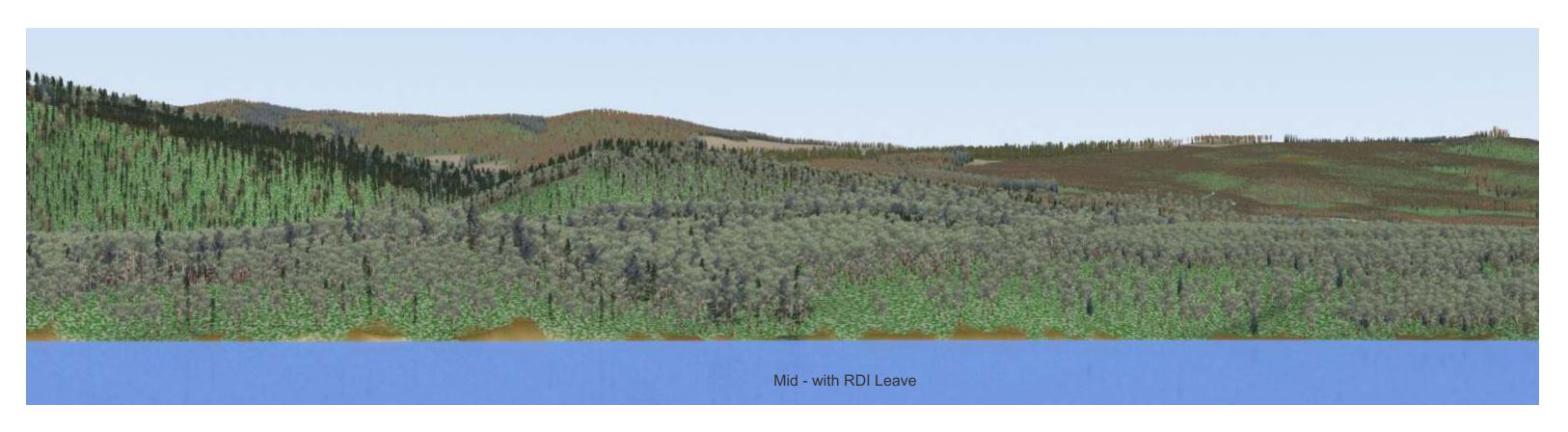
Sutherland Shore Viewpoint - Percent Alteration - Cutblock Plan Leave # 1 (top) and All RDI Suggested Leave (lower)

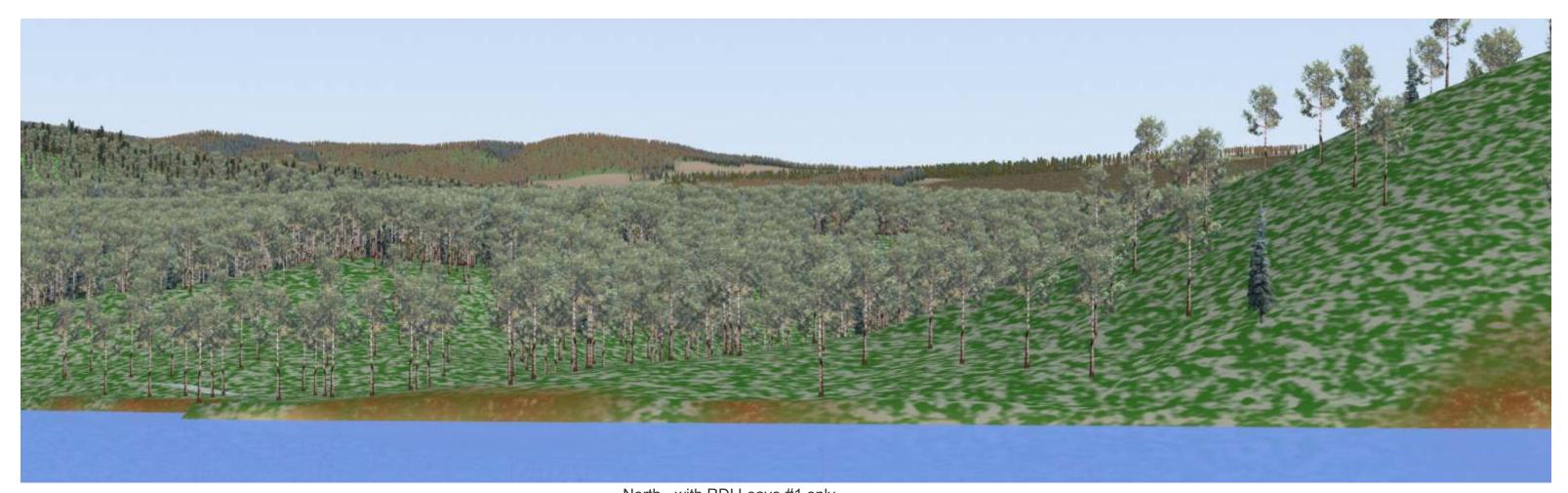






North - Original Plan



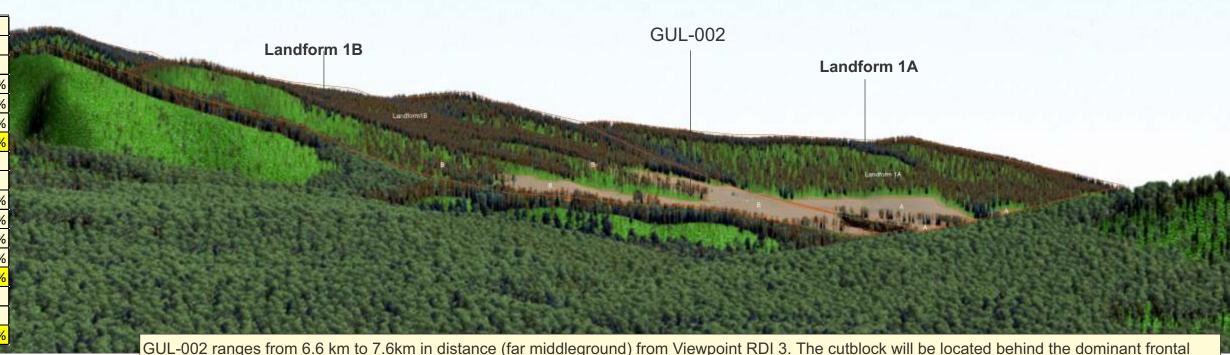


North - with RDI Leave #1 only
Sutherland Mid and North Viewpoints - with RDI Leave #1 only

Percent Alteration Viewpoint RDI 3				
·				
Name_1	AREA	% Alt		
Landform 1A	75959.85			
А	6286.19	8.28%		
А	465.40	0.61%		
Α	113.45	0.15%		
Sum Alt 1A	6865.03	9.04%		
Landform1B	146429.92			
В	3717.16	2.54%		
В	9099.19	6.21%		
В	81.84	0.06%		
В	22.74	0.02%		
Sum Alt 1B	12920.92	8.82%		
Total Combined	222389.77			
	19785.95	8.90%		

## Original Percent Alteration

	Percent Alteration Viewpoint RDI3				
	Name_1	AREA	% Alt		
	Landform1B	146429.92			
	B4	3717.16	2.54%		
	B1	6510.52	4.45%		
	B2	81.84	0.06%		
i Z	В3	22.74	0.02%		
	Sum Alt 1B	10332.26	7.06%		
E	Landform 1A	75959.85			
	A2	465.40	0.61%		
	A3	113.45	0.15%		
Ė	A1	1475.86	1.94%		
Ē	A4	75.01	0.10%		
j	Sum Alt 1A	2129.72	2.80%		
	Landform 1A+1B	222389.77			
	Sum Alt 1A+1B	12461.98	5.60%		



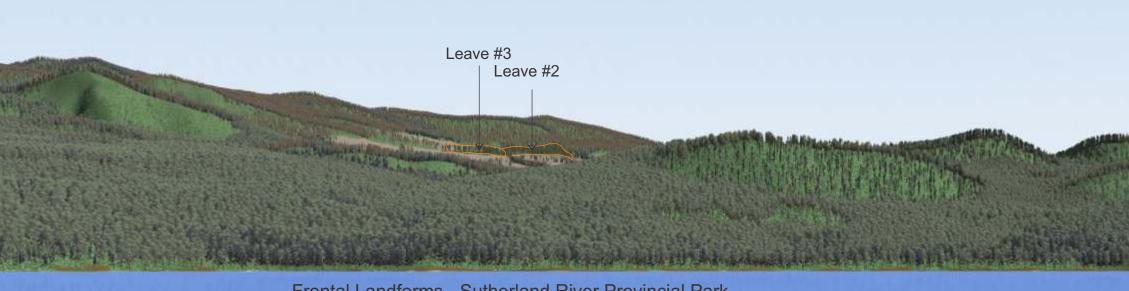
GUL-002 ranges from 6.6 km to 7.6km in distance (far middleground) from Viewpoint RDI 3. The cutblock will be located behind the dominant frontal landforms along the lakeshore which are designated as Sutherland River Provincial Park.

This view offers a glimpse of both Landform 1A and Landform 1B. Together, their viewing width is 20 degrees, with GUL-002 a width of 6 1/2 degrees.

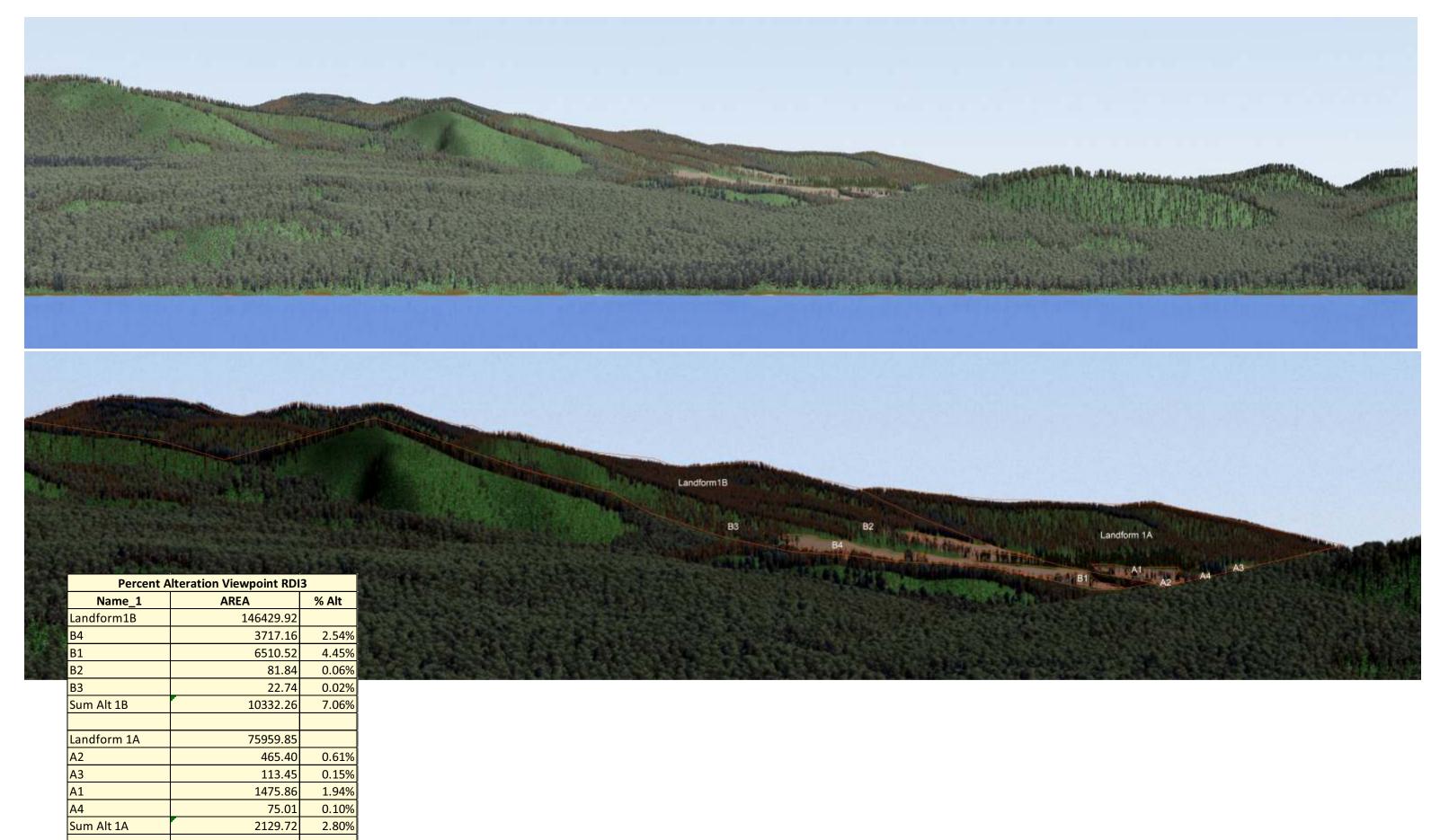
The original Percent alteration was 9.04% for Landform 1A and 8.82% for Landform 1B. The combined effect was 8.9%. The layout has a good location away from the skyline, and has good compatibility with the visual forces in the landforms.

This viewpoint offers a view of Landform 1B and a portion of Landform 1A together and the combined coverage is broader (20 degrees) than from 4-Mile Shore Viewpoint (11 degrees).

RDI designed extra leave patches - Leave #2 in 1A and #3 in 1B are visible, as shown below. Leave #2 is an upper corner of the block, reducing Landform 1A 2.80%. Leave 3 in Landform 1B follows below the mid road, reducing Landform 1B to 7.06%. The patch in Landform 1B may require a road extension below the patch. The combined effect is to reduce Percent Alteration to 5.6%, easdily within Partial Retention VQC, particularly with stengthened visual force and natural shape and pattern.



Frontal Landforms - Sutherland River Provincial Park



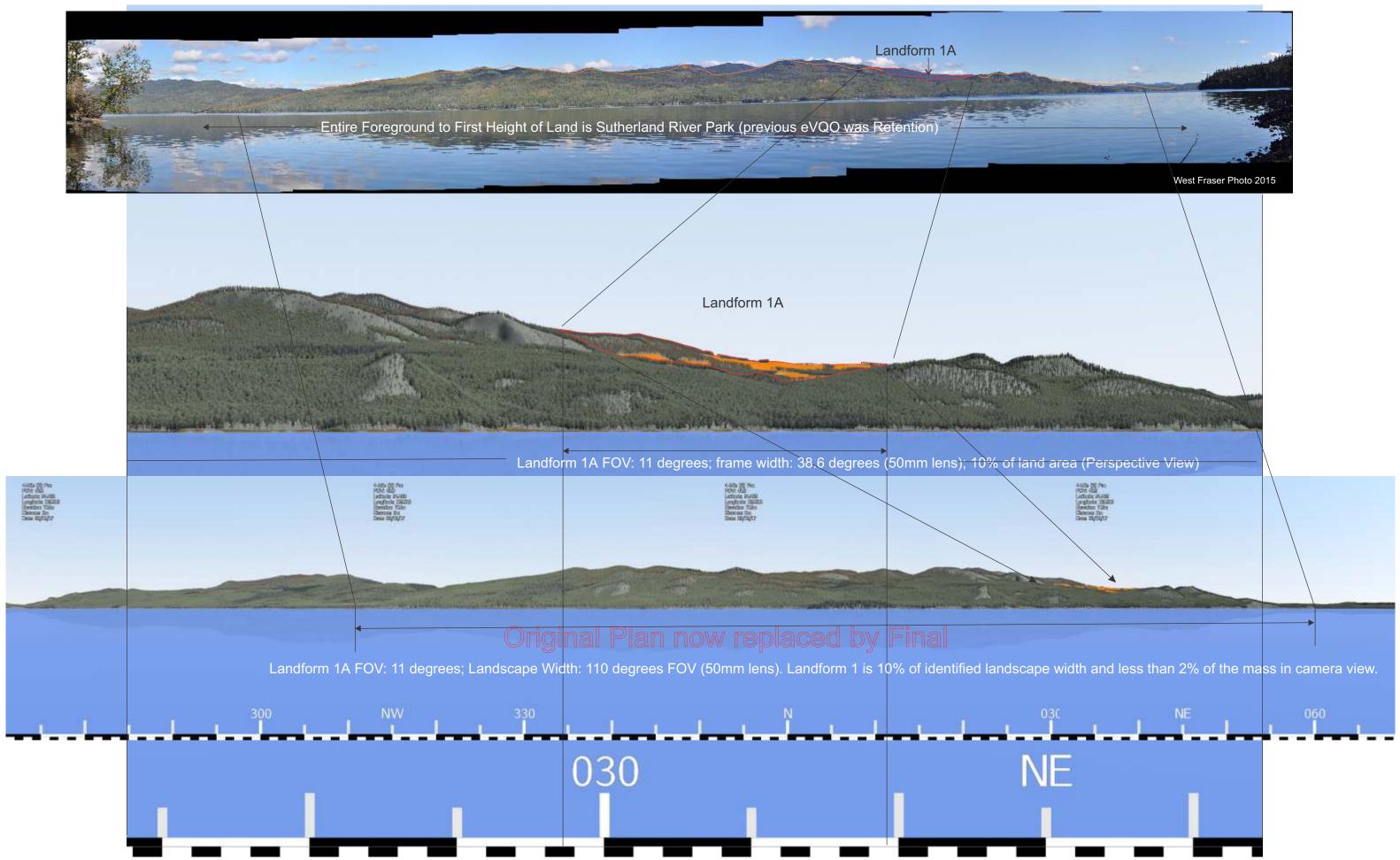
## Final RDI Leave

222389.77

12461.98

5.60%

Landform 1A+1B Sum Alt 1A+1B





West Fraser Photo Panorama 2015

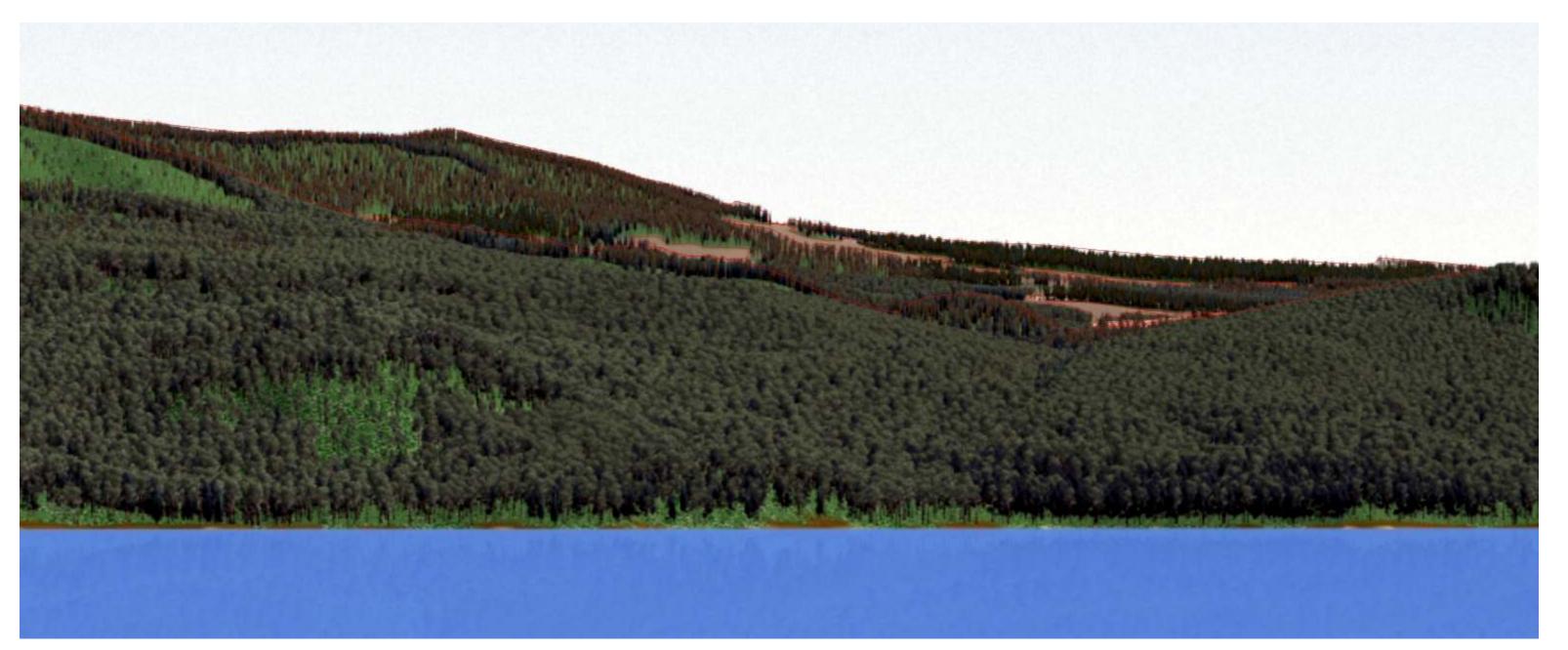


4 Mile Shore Viewpoint GUL-002 Percent Alteration			
Name_1	AREA	% Alt	
Landform 1	57205.64		
GUL-002A	1588.84	2.78%	
GUL-002B	930.11	1.63%	
GUL-002C	6680.29	11.68%	
GUL-002D	1776.51	3.11%	
GUL-002E	1419.48	2.48%	
Sum Alt	12395.23	21.67%	

4-Mile Shore Viewpoint looks towards a minor "gunsight" slice of Landform 1A which has an 11 degree width of view at maximum within the 38 degree (50mm) single VNS camera shot. The landform in this view is 10% of the main landscape width (see previous pages) behind the dominant main landscape of Sutherland River Park along the north shore of the south-east arm of Babine Lake. Landform 1A is a mere 2% of the magnitude of the main park landscape as easily seen from the 4-Mile Shore Viewpoint (110 deg. FOV; 3 camera frames wide).

Because it is a narrow slice, the Percent Alteration is large on the landform (22%) and would be incapable of the meeting Partial Retention VQO. As this viewpoint was presented to RDI by West Fraser for analysis, RDI examined options for optimal reduction in conjunction with the view from Sutherland Shore Viewpoint, while respecting the silvicultural intent to remove as much beetle-infected pine as possible. The results of the RDI suggested leave area (20 hectares) are revealed on subsequent pages.

RDI's professional opinion is that this viewpoint does not represent an appropriate evaluation location for the cutblock in Landform 1A as the majority of the landform is excluded by a much larger, dominant landscape. The landform quickly diminishes and ultimately disappears as one travels closer to the north shore as evidenced in the simulations called 4-mile Mid and 4-mile North. Viewing distance to cutblock is 8.5 km to 9.5 km (background). The view corridor is very narrow on either side of these viewpoints before the cutblock becomes non-visually sensitive (NVS; not seen).



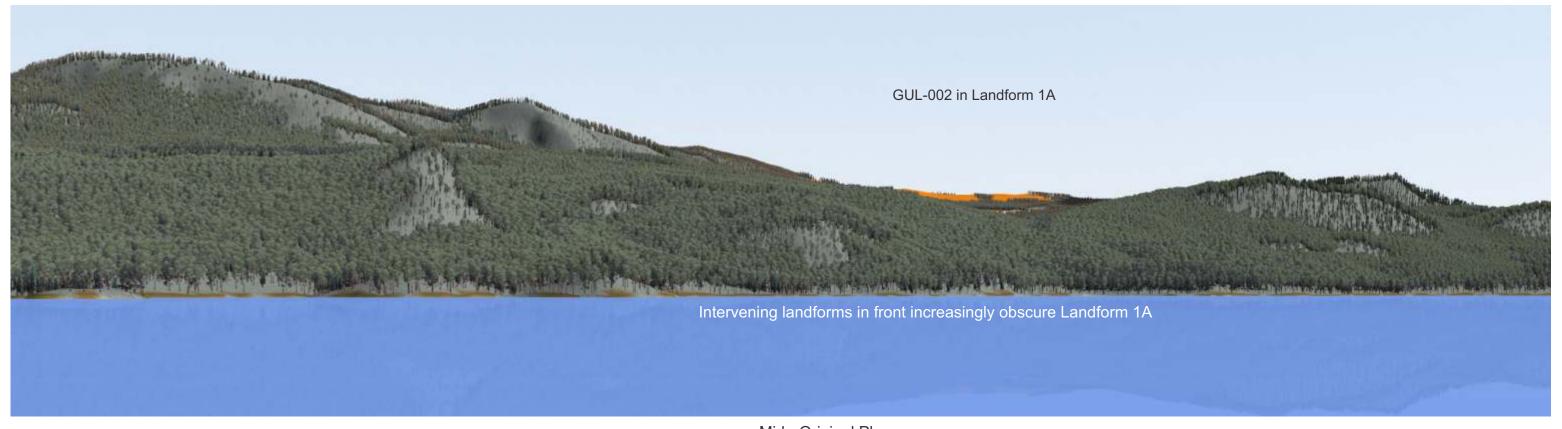
4-Mile Viewpoint Percent Alteration				
Name_1	AREA	% Alt		
Landform	457521.03			
GUL-002-1	6079.79	1.33%		
GUL-002-2	199.90	0.04%		
GUL-002-3	6761.31	1.48%		
GUL-002-4	97.36	0.02%		
GUL-002-5	277.58	0.06%		
GUL-002-6	1843.69	0.40%		
GUL-002-7	5437.63	1.19%		
GUL-002-8	297.26	0.06%		
GUL-002-9	99.95	0.02%		
GUL-002-10	169.34	0.04%		
GUL-002-11	149.15	0.03%		
GUL-002-12	336.62	0.07%		
Sum Alteration	21749.57	4.75%		

RDI designed a series of leave patches to reduce the Percent Alteration from the original of 21.67%. The first step reduced it to 10% with Leave 1 and 2 visible from 4-Mile (presented in the February 28, 2017 draft report). A final attempt to bring the Percent Alteration was encouraged by Jaret van der Giessen in order to carry out the fullest deployment of due diligence. The resulting final RDI leave is fully successful in bringing the Percent Alteration to 4.75%, near the mid-point of Partial Retention.

The alteration relates well with the visual forces. The RDI leave patches significantly strengthen the skyline as well as greatly reducing apparency of the block. Viewing distance to cutblock is 8.5 km to 9.5 km (background). The suggested scale reduction is significant, particularly in recognition of lake and park visual sensitivities.

The landform quickly disappears as one travels closer to the north shore as evidenced in the simulations called 4-mile Mid and 4-mile North.

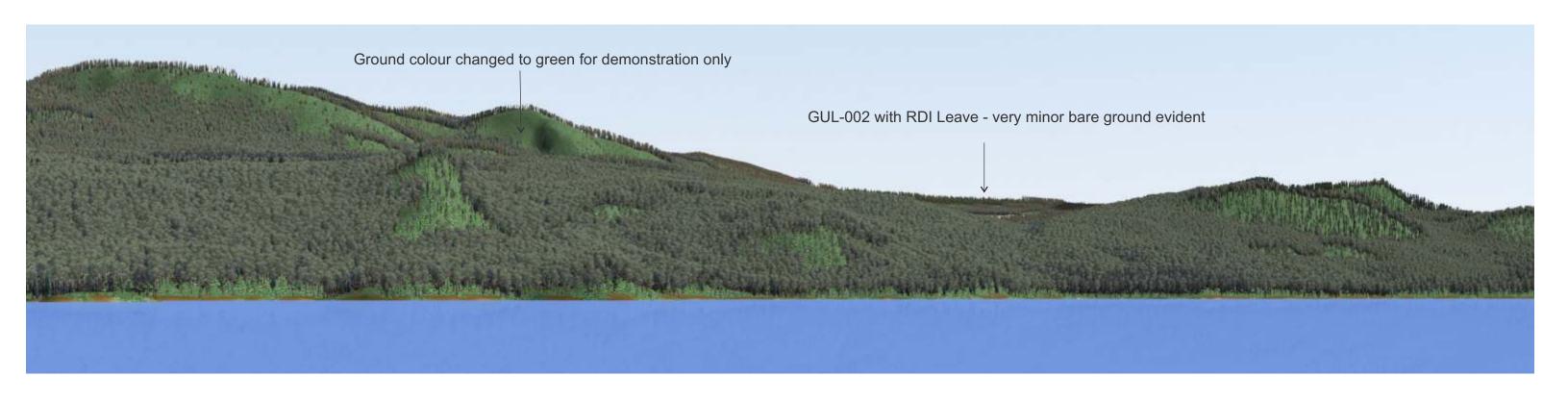
## Final RDI Leave



Mid - Original Plan



North - Original Plan
4-Mile Other Viewpoints - Original Plan



Mid - with RDI Leave



North - with RDI Leave
4-Mile Other Viewpoints with RDI Leave #1 only









RDI 2



\*RDI 3



RDI 4

