Gross Area: 28.0 Ha

HU1 - Ground-Based Harvest - 16.4 Ha NET

HU2 - Cable Harvest - 9.0 Ha NET

WTRA - 1.7 Ha

PAS - 0.9 Ha

Harvest Plan Map

A93872-1

Ryder Creek

BCTS
BC Timber Sales
Kootenay

410500 410600 410700 410800 410900 411000 411100 411200 411300 411400 411500 411600 411700

5550500 5550400 5550300 5550200 5550100 5550000 5549900 5549800 5549700 5549600 5549500 5549400 5549300 5549200 5549100

Culvert Location

Existing	Proposed	Size
		400mm
		450mm
		500mm
		600mm
		700mm
		900mm
		1000mm
		1200mm
		1500mm

1700 1800 1900

East Barnes

W1 0.1ha
W2 1.4ha
W3 0.2ha

Ryder 3000
Ryder 4000
Ryder ML
Ryder 2000

NCD-1-1 NCD-1-2 NCD-1-3 NCD-1-4 NCD-1-5 NCD-1-6
NCD-2-2 NCD-2-3
S6-1-1 S6-1-2 S6-1-3
S6-2-4 S6-2-5 S6-2-6
S5-2-1

A93872-2

Magnetic North / True North
Declination: 15° E
1:5,000
UTM - Datum NAD83
0 100 m

timberland consultants
Nelson, BC

Date: 3/19/2019 Drawn By: AT	Elevation (min / max): 1660-1845m SU Boundary	Lat/Long: 50°05'38" / 118°14'36" Rock #
Mapsheet: 82L009 Cable	Ridge Cliff Slope Break	Reach Break Wet Area Fish Barrier
Existing Cutblock	Existing Road Proposed Road	Seep SP Plot Perm. Landing
Wildlife Tree Retention Area	Existing Trail Backspar Trail	Steep Slopes >35% Temp. Landing
OGMA Non-Merch	Proposed Skid Trail Yarder Trail	Yarder Direction Cabin
Cutblock Boundary	MFZ RMZ Skid Direction	Creek Intermittent Creek
Bench Gully Draw	Permanent Access Licensee Construct	Slope and Direction 25% Prop. Skid Bridge
Station +12 Falling Corner FC2	Temporary Access Licensee Construct	Path: G:\PROJ\T15008_BCTS\A93872_Ryder\Maps\HP Maps\A93872_i4_Map_HP_Blk1.mxd

1.5 RIPARIAN ASSESSMENT

Block	Riparian I.D. and Class	RMA	SU	Width (m)	SPH Retained	Comments (Indicate if in a Community Watershed)
1	S6-1-1 to S6-1-3	RMZ	1&2	20	See Table1	All are located within the harvest area. A 5m MFZ and a 20m RMZ has been ribbonned around the streams in the field in the ground-based portion of the block and only a 20m RMZ has been ribbonned around the streams within the cable portion of the block. Merchantable and non-merchantable reserve will be retained within the RMZ of the streams within the ground-based portion of the block. No merchantable reserve will be retained, where the RMZs are within the cable harvest area. See Table 2 below for information on non-merchantable reserve. / Not within a Community Watershed.
1	NCD-1-1 to NCD-1-6	N/A	1&2	N/A	-	All NCDs except for NCD-1-2 are located within the block. A 5m MFZ has been ribbonned around the NCDs in the field in the ground-based portion of the block. See Table 2 Below for non-merchantable reserve information. Not within a Community Watershed.

Management Strategies: See Non-Merchantable Section and the Harvest /Operational Constraints Section Below

Safety Highlights:

In addition to the standard safety hazards and risks associated with all aspects of forest management, the following safety hazard(s) apply to this block and must be enforced and practiced:

1. Public Traffic on mainlines from hunters, campers, other recreationalists and local residents.
2. Steep slopes >35% are present in a few areas.
3. Downhill cable harvest areas occur within the block.

Remedial Action

1. Personnel will be informed of this hazard and signage will be posted near the proposed development when harvesting and road-building activities are being conducted.
2. Personnel will be informed of this hazard.
3. Personnel will be informed of this hazard.

Leave Tree Specifications:

Table 1. - Layer 1 Reserved Timber[1]

Block	HU	Selection Priority	Species	Size	Stems per Hectare			Distribution[2]			
					Target	Minimum	Maximum	S	G	I	R
1	1	• Most Windfirm • Bl	Bl, Se	Bl, Se >/= 55cm dbh	5	2	10	√	√	√	
1	1 (RMZ)	• Variable Size Classes • Bl	Bl, Se	All	6	4	10	√	√	√	

Additional Requirements/Notes:

[1] Refer to *Appendix I* for *Table of Reserve Timber Abbreviations and Definitions* [2] *Distribution Types: S: Single Trees, G: Groups of Trees, I: Irregularly Distributed, R: Regularly Distributed*

Note: Safety is a priority when conducting operations near reserved timber. Refer to TSL Schedule "A", Section 2.00 regarding Dangerous Trees.

Table2. – Other Reserved Timber[1]

Non-Merchantable

Block	HU	Location(s)	Species	Size	Stems per Hectare	
					Target	Minimum
1	1&2	MFZ of NCDs and S6s and within the area that is 5m on either side of all NCDs/S6s without MFZ	All + Brush Species	<12.5cm dbh	All, where present and where operationally feasible.	All, where present and where operationally feasible.
1	1&2	RMZs	All	<12.5cm dbh	All, where present and where operationally feasible.	All, where present and where operationally feasible.

Dead Trees to be Stubbed (where Mechanical Falling is utilized)

Block	HU	Species	Size	Stubbing Height	Stems per Hectare			Distribution[2]			
					Target	Minimum	Maximum	S	G	I	R
1	1	All	>/=35cmdbh	3-5m	7	5	10	√	√	√	

Additional Requirements: 1. Stub trees must not pose a hazard to worker safety. 2. In selecting dead trees for stubbing, give selection priority to trees with signs of wildlife use (e.g. cavity nests, holes, and dens).

Coarse Woody Debris

Block	HU	Species	Size	M^3 per Hectare		Distribution[2]			
				Target	Minimum	S	G	I	R
1	1&2	All	Retain CWD and wildlife trees that are representative (spp, age and size) of pre-harvest levels/conditions.	15	10	√	√	√	

[1] Refer to *Appendix I* for *Table of Reserve Timber Abbreviations and Definitions* [2] *Distribution Types: S: Single Stems/Logs, G: Groups of Stems/Logs, I: Irregularly Distributed, R: Regularly Distributed*

Note: Manage CWD levels to pre-harvest levels, except in areas where concentrations are too high for effective planting and/or successful regeneration. Safety is a priority when conducting operations near reserved timber. Refer to TSL Schedule "A", Section 2.00 regarding Dangerous Trees.

Harvest / Operational Constraints:

1. All temporary access structures must be fully rehabilitated upon the completion of harvesting.
2. Bladed or Excavated trails may be required for safety in areas that may require adverse skidding and in areas with steep slopes.

TSA Recommendations

General Operational Recommendations:

1. Harvesting and road building activities should be modified or suspended when there is abundant hill slope runoff occurring at the site, which is likely to occur during times such as spring break-up or from prolonged heavy precipitation. This is intended to reduce the likelihood of concentrated or redirected drainage as well as erosion and sediment delivery.
2. In general, the following cut slope angles are recommended:

• 0.25H:1V for competent bedrock • 0.5H:1V for highly fractured bedrock, and as a cut off for the upper 0.5 m of soil where side slopes exceed 50% • 1H:1V for compact to dense thick till and loose to compact colluvial and glaciofluvial materials on slopes in excess of 50% gradient • 1.25H:1V for compact to dense till and loose to compact colluvial and glaciofluvial materials on slopes less than 50% gradient

3. In general, fill slope angles are recommended at 1.5H:1V, with allowance for steeper fills where specific materials and methods are used:

• General Rock Fills: maximum 1.25H:1V • Wood-support Fills: maximum 1.25H:1V • Keyed Rock Fills: maximum 1.1H:1V • Placed Rock Fills: maximum 1H:1V

4. Cross-drain and stream culverts have been identified in the proposed culvert summary tables on Figures 3, 4 and 5. Additional cross-drain culverts and changes to planned locations may be warranted based on conditions encountered during construction. Final cross-drain culvert requirements are to be confirmed by the BCTS Road Construction Supervisor at the time of construction based on conditions encountered.
5. All proposed and existing road and trail drainage systems should be maintained and kept clear of debris during and subsequent to harvesting operations, including at and downslope of culvert discharge locations.
6. Excavated or bladed trail construction should be minimized as practical, and avoided in areas of seepage or where shallow subsurface runoff is likely to be intercepted. Where imperfectly drained or poorly drained areas cannot be avoided, effective drainage control should be installed and puncheon can be used to reduce impact.
7. All trails2 should be fully rehabilitated upon completion of use and concurrent with operations, prior to the next spring freshet. If any trails are to remain in place for an extended period of time prior to rehabilitation, then additional precautions should be taken including pulling back all watercourse crossings and any potentially unstable fill slopes, and installing frequent cross-ditches in order to limit the potential for redirected runoff.
8. Machine use should be limited to areas where excessive scour, rutting, or compaction is avoidable. This would generally restrict machine use from areas of moderately steep or steeper slopes as well as any localized areas of wet, soft, or very loose soils. Some modified machine use (e.g. hoe-chucking) may be possible in these areas if excessive disturbance is avoidable.
9. All natural drainage patterns (including all NCDs and S6 streams as well as dry swales and gullies) should be maintained and left free of excess debris (slash or soil) that could result in a redirection of seasonal surface runoff. Temporary skid bridges are recommended for all watercourse crossings.
10. Seasonal deactivation should be installed on all roads in the development area following operations or during shutdown periods in order to control erosion and sediment delivery to fish habitat, as well as to back-up road drainage systems at watercourse crossings and reduce the potential for redirected runoff.

Specific Recommendations:

Winter harvesting on an adequate snowpack is recommended as an option to facilitate yarder and backspar trail construction in rocky terrain and/or imperfectly drained to poorly drained areas. Winter harvesting would also reduce site disturbance including sedimentation within watercourses with connectivity to downstream fish habitat, as well as reduce the likelihood of redirected and/or concentrated runoff which could result in a landslide.

Block 1 (Refer to Figure 3)

1. Recommend using puncheon/wood-supported fill construction through imperfectly drained sections of Ryder 3000 (maximum road term 5 year).

See TSA for Field Review Recommendations.

Kootenay Business Area Field Marking Standards

	Ribbon	Paint
Harvest Boundary	BCTS Block Boundary	
Falling Corners		FC#
WTRA Boundary	Reserve	
Reserve Boundary	Reserve	
Riparian Reserve Zone	Reserve	
Riparian Management Zone	Riparian Mgmt. Zone	
Management Zone	Management Zone	
Treatment Unit Boundary	Treatment Unit Boundary	
Reserve Trees		
Machine Free Zone	//// Machine Free Zone ////	
Cruising	Cruise Line	Plot Trees
Traverse Stations		
SP Plot Location		

	Ribbon	Paint
NCD & Stream Centers	Water Course	
Road P-Line		
Road Center Line	Road Centerline	
Landings	Landing	
Road Right of Way	R/W Boundary	
Road RP		
Culverts	Culvert	
Designated Crossing	Crossing	
Culvert RP Outside Right of Way		
Tail Holds / Guyline / Intermediate Supports		
Skid Trail / Back Spar Trail / Forwarding Trail	/ / / / / / Trail / / / / / /	
Recce Ribbon / D-Line / Skyline Roads	/ / / / / / / / / / / / / / /	

I certify that the work described herein fulfills standards expected of a member of the Association of British Columbia Forest Professionals, and that I did personally supervise the work.

RPF PRINTED NAME

Stefano De Vuono

DATE SIGNED

April 15, 2019

RPF'S SIGNATURE and SEAL