SITE PLAN CP 410 BLOCK 12
COOPER CREEK CEDAR LTD.

A. TENURE IDENTIFICATION

LICENCE NO.:	CP:	BLOCK:	TIMBER MARK:	UTM:	LICENSEE NAME:
FL A30171	**410**	**12**	**FE5410**	**500700 E, 5498000 N**	**Cooper Creek Cedar Ltd.**
AREA UNDER TENURE (ha):	MAPSHEET/OPENING #:		ELEVATION:	LOCATION:	
27.9	**082F066**		**845-1160m**	**Balfour Face**	

B. AREA SUMMARY

AREA OF NO PLANNED REFORESTATION (ha) (NPR)									
PERMANENT ACCESS	ROCK	WATER	SWAMP	OTHER NP	NC>4ha	WILDLIFE TREE RETENTION AREA (HA):	IMMATURE	OTHER	TOTAL NPR AREA
1.3	**-**	**-**	**-**	**-**	**-**	**8.5**	**-**	**-**	**9.8**

NET AREA TO BE REFORESTED (ha)		
SU	SU AREA DESCRIPTION	NET AREA TO BE REFORESTED:
A	**ICHdw1 $103_7 104_3$** The block is located on Balfour Face upslope of the community of Balfour. The aspect of SU A is mainly south facing, slopes range from 10 to 45% with an average of 25%. Surface soil texture is Loam (L), and subsoil textures are a Fine Sandy Loam (FSL). Soils are moderately to well drained. Coarse fragment content is moderate (55%) in surficial soils, and high in subsoils (75%). Moisture regime is subxeric and nutrient regime is medium. Humus form is a moder (6.0cm thickness) and rooting depth is 53cm. Soils in SU A exhibit **non-sensitive** characteristics. The block includes three Wildlife Tree Retention Areas separated by roads comprised of the wetter riparian area around Haiseldean Creek and several NCDs, timber, patches of non-valuable (immature or dead useless) timber, rich wildlife features, and will act as a visual aide to help achieve a partial retention Visual Quality Objective. SU A will be harvested with **Conventional Ground Based** methods using a Retention silviculture system with Reserves. Retain 35-40 stems per hectare of Fd, Lw, and Py in the >=45cm DBH class to provide stand structure, biodiversity, visual and wildlife values, and to manage for wildfire mitigation, in addition to the WTRA retention.	**17.9**
	TOTAL NET AREA TO BE REFORESTED:	**17.9**
	TOTAL AREA UNDER THE PLAN:	**27.7**

SOIL DISTURBANCE

SU	Max. Allowable Soil Disturbance (%)	Max. Amount TAS May Exceed MASD Prior to Rehab (%)	Max. Allowable Soil Disturbance For Roadside Work Areas (%)	Maximum Permanent Access Structures (%)
A	10.0	5.0	25%	5.0

SU	CRITICAL SITE CONDITIONS THAT AFFECT THE TIMING OF OPERATIONS AND HOW THEY AFFECT THEM
A	• Avoid machine travel during periods of soil saturation to reduce risk of soil compaction. Utilize designated harvesting trails, or a supporting snow pack in the winter. • Spot piling along roadsides, landings and within the NAR may be necessary to remedy high levels of coarse woody debris.

RESULTS AND STRATEGIES

Biodiversity Objectives	Landscape Unit K10
Result or Strategy Description	**3.5.3 - Old and Mature Forest**
Applies:	YES
How the Result or Strategy Applies to the Site (or Rationale if it does not apply)	'KBHLP Objective 2 – Old & Mature Forests' Field data collection found this block to be ICH dw1, and the block lies within Connectivity Corridor. CP410 falls within Landscape Unit K10: West Arm For the ICH dw1, there is a Mature + Old forest requirement in this landscape unit. Analysis completed by Timberland (August 29, 2018) shows that post-harvest there will be a surplus of Mature + Old within the Landscape Unit ICH dw1 as a whole, and also within connectivity corridor.
Result or Strategy Description	**3.5.3 - Green-up**
Applies:	YES
How the Result or Strategy Applies to the Site (or Rationale if it does not apply)	'KBHLP Objective 4 – Green-up' – The proposed cutblock is consistent with FPPR Section 65(2).
Result or Strategy Description	**3.5.1 - Objectives set by Government for Wildlife and Biodiversity – Landscape Level**

Applies:	YES
How the Result or Strategy Applies to the Site (or Rationale if it does not apply)	'KBHLP Objective 4 – Green-up'. The proposed cutblock complies with Sections 64 and 65 of the FPPR. Adjacent existing cutblocks are consistent with FPPR Section 65.
Cultural Heritage Resources	
Result or Strategy Description	**3.7 - Objectives set by Government for Cultural Heritage Resources**
Applies:	YES
How the Result or Strategy Applies to the Site (or Rationale if it does not apply)	A referral letter dated February 14, 2018, was sent to the appropriate individual(s) and/or group(s). Cooper Creek Cedar Ltd did not receive any comments from First Nations identifying any concerns with the proposed development that had the potential of impacting cultural heritage values. No cultural heritage values were noted in this area.
Recreation Resources	
Result or Strategy Description	**4.3 - Recreation Sites**
Applies:	NO
How the Result or Strategy Applies to the Site (or Rationale if it does not apply)	The proposed cutblock is not located within a designated Recreational Area or Trail with legal objectives; therefore, managing for Recreation Resources in not applicable.
Riparian Management	
Result or Strategy Description	**3.4.1 Objectives set by Government for Fish, Water, Wildlife & Biodiversity in Riparian Areas**
Applies:	YES
How the Result or Strategy Applies to the Site (or Rationale if it does not apply)	1) One **S6** class stream **(Haiseldean Creek)** and its associated RMZ are reserved within WTRA. There are three minor NCDs within the same WTRA area. 2) See Section E.1 for Riparian Management Strategies. 3) See Section F for management strategies related to Temporary Access Structures and Soil Disturbance that should be used during and post-harvest in order to prevent/reduce soil disturbance and sediment delivery.
Soil Objectives	
Result or Strategy Description	**3.1 - Objectives set by Government for Soils [FPPR Section 5 and 12.1(1)]**
Applies:	YES
How the Result or Strategy Applies to the Site (or Rationale if it does not apply)	1) **SU A** does not contain sensitive soils and soil disturbance will not exceed **10%**. Specific measures for mitigating soil disturbance levels are addressed in Section F of this Site Plan. 2) Areas of the block where temporary access structures are required will be rehabilitated. Specific rehabilitation measures are addressed under Section F of this Site Plan. 3) PAS will not exceed the recommended limit of **7.0%** and is estimated at **4.7%.** 4) Areas within the block assigned to roadside work areas will not exceed **25%**.
Visual Objectives	
Result or Strategy Description	**3.6 – Visual Quality**
Applies:	YES
How the Result or Strategy Applies to the Site (or Rationale if it does not apply)	**CP 410** falls partially within a polygon with a PR objective. A Visual Impact Assessment was completed by Timberland Consultants in March 2018, and the proposed blocks meet the definition and requirements of PR. Irregular shaped boundaries that follow natural terrain features, and large reserve areas surrounding Haiseldean Creek serve to improve visual quality of Block 12 from selected viewpoints. 35-40 stems/ha of mature retention throughout Block 12 will enhance visual quality. The proposed development of **CP410** meets the established VQO of PR from the selected viewpoints.
Water Management Objectives	
Result or Strategy Description	**3.4.4 - Consumptive Use Streams**
Applies:	Yes
How the Result or Strategy Applies to the Site (or Rationale if it does not apply)	'KBHLP Objective 6' – **CP410 Block 12** is located within the Laird Face Domestic Watershed. Referral letters dated April 5, 2018 were sent to POD licensees with a 30 day response period. Several comments were received from water users. **Haiseldean Creek (S6 Class)** has one licensed POD which is approximately 875m downstream of the block. Management with regard to the comments received includes an expansion of the WTRA to provide a mature timber reserve 20-50m off the stream which exceeds the RMZ requirements set out in the 2017-2022 Porcupine Wood Products FSP. The WTRA also protects a number of ephemeral tributaries to Haiseldean Creek. The large WTRA serving as a riparian reserve will help avoid or minimize disturbance to water quality for downstream water users. For the Spur 1 crossing of Haiseldean Creek, a sediment settling structure (small pond lined with geotextile fabric) was installed on the east side of the stream directly downslope of the cutslope in order to reduce the risk of sedimentation of downstream water intakes **Comments from TSA:** Balfour Face, CP410, Blocks 10, 11, 12, and 13 from July 30, 2018 by Perdue Geotechnical Services: Seasonal groundwater emergence was identified along the cut bank of an historic, overgrown access road within the southwestern corner of the block with no surface drainage control measures along the in-block length. As a result, the section of the abandoned road within, immediately adjacent to and downslope of Block 12 should be rehabilitated concurrently with the completion of timber harvesting to restore natural drainage patterns.

Wildlife Objectives	
Result or Strategy Description	**3.3.1 - Objectives set by Government for Wildlife - Species at Risk – Section 7 of the FPPR**
Applies:	NO
How the Result or Strategy Applies to the Site (or Rationale if it does not apply)	The block is not within a Wildlife Habitat Area. There were no sightings of Species at Risk during field development of this cutblock.
Result or Strategy Description	**3.5.2 - Objectives set by Government for Wildlife and Biodiversity – Stand Level**
Applies:	YES
How the Result or Strategy Applies to the Site (or Rationale if it does not apply)	Three Wildlife Tree Retention Areas are planned for this block, totalling **8.5ha**. Overall wildlife tree retention percentage for block 12 is approximately **30.7%.** Total WTRA for CP410 is **22.9ha** which constitutes approximately **24.1%** of the gross area of the permit. The WTRA area meets the minimum percent requirements stated in the FSP for each block (3.5%) and for the whole cutting permit (7%).
Result or Strategy Description	**3.3.2 - Ungulates**
Applies:	YES
How the Result or Strategy Applies to the Site (or Rationale if it does not apply)	The proposed development CP410 is located within UWR Management Unit 178 and overlaps five distinct polygons with specific requirements in the ICHdw. Analysis completed by Timberland (August 29, 2018) shows that post-harvest, Ungulate Winter Range Management Unit 178 meets the minimum retention and maximum disturbance requirements for snow interception cover and forage areas.

ADDITIONAL COMMENTS

Consistency Statement

This block is consistent with the approved **2017 to 2022 Forest Stewardship Plan for Cooper Creek Cedar Ltd – Forest Licence A30171**.

This Site Plan is prepared for **FL A30171 CP 410 Block 12**, in accordance with FRPA Section 10(1), (2) & (3).

Climate Change and Wildfire Resiliency

Leave Trees

SU A: Retain 35-40 stems per hectare of Fd, Lw, and Py in the >=45cm DBH class to provide stand structure, biodiversity, visual and wildlife values. Give preference to larger diameter, wind-firm dominants and/or vets

Py, Fd, and Lw are more likely to survive a fire than the other species on site. Thinning the stand from above while retaining fire resilient stems and minimizing the surface fuels to meet the minimum CWD requirements is a recognized fire mitigation management plan. The objective is to retain larger, healthy stems with live crowns while maintaining a 3-5-m spacing between the crowns. The larger leave trees have higher crowns, which means a longer distance between surface fuels and tree crowns; reducing the effective ladder fuels, and reducing the likelihood of the fire moving into the canopy. Regularly spaced leave trees will shade the understory, which will help reduce ground temperatures and prevent brush species from becoming established, further reducing the ladder fuels. Leave tree distribution is expected to be regular where large stems exist and is operationally feasible to do so. Adequate inter-crown spacing prevents the spread of a potential wildfire between leave trees, while still providing ground shading. Post harvest the stand will be easier to protect should a fire occur – fire will move more slowly through the stand due to less ground fuel, an open stand with clean ground & a more open canopy that will let more water and fire retardant through to the ground from air drops than a full canopy stand. The roads and trails constructed to access the block will provide better access for the fire fighters.

The current stand is heavy to Fd; therefore planting Lw & Py will make the stand more resilient to adapt to changing climate conditions & to adapt to species specific pest.

Community Watersheds

FSP Section **3.4.3**

Not applicable - The proposed block is not located within a Community Watershed.

Enhanced Resource Development Zones

FSP Section **3.2.1**

'KBHLP Objective 7 – Enhanced Resource Development Zones – Timber'

Block 12 is not within an Enhanced Resource Development Zone.

Fire Maintained Ecosystems

FSP Section **3.5.3**

'KBHLP Objective 8 – Fire maintained Ecosystems'. There are no NDT 4 ecosystems in the FDUs under this FSP, therefore the requirement to create a Result/Strategy for this objective does not apply.

Fisheries Sensitive Watersheds

FSP Section **3.4.2**

At the time the FSP was developed there were no designated "Fisheries Sensitive Watersheds" in FDUs under this FSP, therefore the requirement to create a Result/Strategy for this objective does not apply.

Invasive Plants

FSP Section **4.1** – Invasive Plants

The IAPP website was checked on May 31, 2018. The following invasive species were reported in nearby areas to **CP 410,** mainly at low elevations within the first km of Balfour Face FSR in the general area of the Balfour Transfer Station: Canada thistle, Chicory, Common tansy, Himalayan blackberry, Hoary alyssum, Japanese knotweed, and Spotted knapweed.

Measures to prevent the introduction or spread of invasive plants noted in the FSP include:

- Cleaning equipment before moving from a worksite with existing infestations to a new work site.
- Minimizing soil disturbance during primary forest activities (PFA).
- Reseed exposed mineral soil, resulting from a PFA in the first available fall or spring within 12 months following the soil disturbance. Plan planting of cutblocks as soon after harvesting as possible.
- During PFAs minimize soil disturbance by:
  - Harvest on a snowpack, when feasible
  - Random skid to designated skid trails to minimize skidder traffic on the ground
  - Utilize benches for skid trails to minimize side cuts
  - Utilize brush to construct skid trails to reduce contact with the ground
  - Use overhead cable harvesting systems on steep ground
- Where grass seeding is undertaken, CCC will use certified grass seed (Canada common #1 or better grade) from reputable suppliers to ensure premium quality free of invasive plant seed, or a seed mix recommended by a MFLNRO range specialist.
- See FSP for additional strategies and practices regarding invasive plants.

Natural Range Barriers

FSP Section – **4.2**

Not applicable. There are no range tenures located in the FDUs covered by this FSP.

Timber

FSP Section **3.2** - Timber

As per Sec 12(8) of the FPPR, results or strategies are not required for an objective set by government for timber.

Wildlife - Caribou

FSP Section – **3.3** and **3.5.3**

'KBHLP Objective 3 – Caribou' was cancelled and replaced by *GAR Order #U-14-012 – Mountain Caribou – Southwest Kootenay Planning Unit.* This block does not fall within a Caribou Management Zone.

Wildlife – Grizzly Bear Habitat - Connectivity

FSP Section **3.3** and **3.5.3**

'KBHLP Objective 5 – Grizzly Bear Habitat & Connectivity Corridors'. Not applicable to the FDU which includes this block.

Block 12 falls within Connectivity Corridor area. Applicable targets for Old and Mature forest will be met following harvest.

STOCKING REQUIREMENTS

SU	NAR (ha)	Standards ID #	Other Performance Standards
A	17.9	1057450	See Section H - Stocking Requirements

C. MANAGEMENT OBJECTIVES & STRATEGIES

C.1 MANAGEMENT OBJECTIVES

- Objectives for **CP 410 Block 12** include meeting visual quality objectives, protecting nearby streams, maintaining water quality, managing for a changing climate, contributing to fire mitigation strategies, and maintaining rich biodiversity and wildlife values: All of these objectives are carefully considered, and in some cases there are trade-offs in strategies (e.g. Leave tree density for visuals vs. fire mitigation), but a balance between all management objectives is the goal.
- Harvest this mature stand of **FdPy(CwBgPlLw)** for sawlogs, chips and value-added products and manage for a healthy, free growing stand of planted and natural **FdLwPy(PlPw)** for similar end products.
- **Wildlife Tree Retention Area (WTRA):** Three reserves are planned for retention, totalling **8.5ha** in size (30.7% of the block). The reserve shelters mature stand values, riparian values, wildlife values, and portions of stand structure that are similar to the harvest area.
- **Kootenay Boundary Land Use Plan – Implementation Strategy (June 1997):** This block is located within the designated **Landscape Unit K10** (West Arm) – Intermediate BEO Assignment.

C.2 CONDITIONS THAT MUST EXIST AFTER HARVEST OR TREATMENT TO ACCOMMODATE KNOWN FOREST RESOURCES

C.2a WILDLIFE

Stand Level attributes/ concerns identified:

Ungulate Winter Range:

The proposed development CP410 is located within UWR Management Unit 178 and overlaps five distinct polygons with specific requirements in the ICHdw.

Analysis completed by Timberland (August 29, 2018) shows that post-harvest, Ungulate Winter Range Management Unit 178 meets the minimum retention and maximum disturbance requirements for snow interception cover and forage areas.

Migratory Bird Habitat Assessment: The majority of Block 12 is within Migratory Bird Risk Rating 4 polygon (VRI Age Class 5 and 6/Mixed Conifer/) – ICH Mixed Conifer FdCwPy(LwBgPl). The management matrix therefore requires the implementation of at minimum one Best Management Practice (BMP) with a Degree of Protection rank of at least moderate. BMP's LO2 and PL2 have been implemented on site to reduce the likelihood of incidental take and to conform with CCC's adopted management strategy. LO2 refers to higher levels of retention prescribed surrounding riparian features: This has been implemented with a WTRA protecting the riparian area surrounding Haiseldean Creek and NCDs flowing into it. PL2 refers patch retention designed around "biodiversity anchors" which is also achieved by protecting Haiseldean Creek, its RMZ, as well as a wide area surrounding any wet or riparian features. See Cooper Creek Cedar Ltd. Migratory Bird Management Strategy for CP410 Block 12 for more details.

Slope values are low to moderate in the block, with a few smaller areas of short, steeper slopes. Middle to upper elevation ICH dw1 site conditions. Aspect is south facing, with short broken slopes. Middle slope location. Vegetation cover is moderate to high over most of the unit. An S6 class stream (Haiseldean Creek) runs through WTRA on the east side of the block. Minor NCDs exist outside the harvest area (within WTRA). All road access will be new construction. Old trails are present throughout the block. Existing coarse woody debris levels are low (10-30cm diameter) in most areas.

SU A: Stand type is: Fd_9Py_1(CwBgPlLw). Large Fd snags with loose bark are scattered throughout the stand.

Average stand density (all species) is 537 stems/ha. Most stems fall within the 20-60cm DBH classes, with 1.2% of stems in the 65-100cm DBH class. Approximate species densities are Fd 351 stems/ha, Cw 68 stems/ha, Pl 64 stems/ha, Bg 27 stems/ha, Py 19 stems/ha, and Lw 7 stems/ha. Other species such as Hw Ep At Pw occur throughout the block in small numbers, but were not picked up by the cruise. Stand age ranges from 75-141 with an average of 92 years old. The understory contains low densities of Fd Ep Cw regen, saplings and poles that are mainly in poor (suppressed) to moderate condition but growing well in openings.

Forest cover adjacent to the block includes similar mature stands with natural openings outside the Southwest boundary, and previous harvesting to the East of Haiseldean Creek.

Actions prescribed:

Total Area specified for the retention of wildlife trees: **8.5ha** (30.7% of gross area)

Wildlife Tree Retention Patch (WTRA):

WTRA-1 (0.7 ha) Cw6Bg3Fd1(EpHw): This WTRA is located in the south of the block downslope of Spur 1 surrounding an incised gully within the riparian area of Haiseldean Creek (S6). Density is 500 - 600 sph; Height range is 20-35m; DBH range is 25-45cm; Age class is 5/6. Slope values range from moderate to high in gully walls, and crown closure is 70%. Values within the area include riparian area, large diameter stems, CWD, and snags. Ungulate scat and wildlife trees with woodpecker cavities were identified within the WTRA.

WTRA-2 (3.8 ha) Cw7Hw3(BgFdLw): This WTRA is located in the central portion of the block between Spur 1 and Spur 2 surrounding an incised gully within the riparian area of Haiseldean Creek (S6). Density is 500-600 sph; Height range is 20-35m; DBH range is 20-40cm; Age class is 5/6. Slope values range from moderate to high in gully walls, and crown closure is 78%. Values within the area include riparian area, large diameter stems, CWD, and snags. Ungulate scat, wildlife trails, and woodpecker cavities were identified within the WTRA.

WTRA-3 (4.0 ha) Hw5Cw4Bg1(FdEp): This WTRA is located in the northeast portion of the block upslope of Spur 2 surrounding the wet riparian area of Haiseldean Creek (S6) and NCDs 1, 2, and 3. Density is 300-400 sph; Height range is 20-35m; DBH range is 18-35cm; Age class is 6. Slope values range from low to moderate, and crown closure is 70%. Values within the area include riparian area, large diameter stems, CWD, and snags. Ungulate scat, wildlife trails, and woodpecker cavities were identified within the WTRA.

The WTRAs have been established in part, as a best management practice for the reduction of migratory bird incidental take **(BMP LO2 and PL2)**, to maintain ecological integrity within riparian areas, to ensure compliance with Visual Quality Objectives, and to mitigate risk to downslope terrain hazards.

Snags

Retain safe snags **<5m tall** in **SU A** where operationally feasible. Snags with evidence of wildlife use are preferred.

C.2c FISHERIES

There are no fish streams within or directly adjacent to the block.

See Section E.1 for Riparian Management Strategies.

Drainage from the majority of the cutblock area flows downslope to the South, towards the community of Balfour.

C.2d WATERSHEDS

'KBHLP Objective 6' – **CP410 Block 12** is located within the Laird Face Domestic Watershed.

Referral letters dated April 5, 2018 were sent to POD licensees with a 30 day response period. Several comments were received from water users.

Haiseldean Creek (S6 Class) has one licensed POD which is approximately 875m downstream of the block.

Management with regard to the comments received includes an expansion of the WTRA to provide a mature timber reserve 20-50m off the stream which exceeds the RMZ requirements set out in the 2017-2022 Porcupine Wood Products FSP. The WTRA also protects a number of ephemeral tributaries to Haiseldean Creek. The large WTRA serving as a riparian reserve will help avoid or minimize disturbance to water quality for downstream water users.

For the Spur 1 crossing of Haiseldean Creek a sediment settling structure (small pond lined with geotextile fabric) was installed on the east side of the stream directly downslope of the cutslope in order to reduce the risk of sedimentation of downstream water intakes

Comments from TSA: Balfour Face, CP 410, Blocks 10, 11, 12 and 13

Seasonal groundwater emergence was identified along the cut bank of an historic, overgrown access road within the southwestern corner of the block with no surface drainage control measures along the in-block length. As a result, the section of the abandoned road within, immediately adjacent to and downslope of Block 12 should be rehabilitated concurrently with the completion of timber harvesting to restore natural drainage patterns.

C.2e RECREATION

Not applicable. The proposed cutblock is not located within a designated Recreational Area or Trail with legal objectives.

C.2f BIOLOGICAL DIVERSITY

Landscape Unit - K10 (West Arm): Intermediate BEO Assignment.

C.2g VISUAL RESOURCE MANAGEMENT

CP 410 falls partially within a polygon with a PR objective.

A Visual Impact Assessment was completed by Timberland Consultants in March 2018, and the proposed blocks meet the definition and requirements of PR. Irregular shaped boundaries that follow natural terrain features, and large reserve areas surrounding Haiseldean Creek serve to improve visual quality of Block 12 from selected viewpoints. 35-40 stems/ha of mature retention throughout Block 12 will enhance visual quality.

The proposed development of **CP410** meets the established VQO of PR from the selected viewpoints.

C.2h CULTURAL HERITAGE

A referral letter dated February 14, 2018, was sent to the appropriate individual(s) and/or group(s).

Cooper Creek Cedar Ltd did not receive any comments from First Nations identifying any concerns with the proposed development that had the potential of impacting cultural heritage values.

No cultural heritage values were noted in this area. See section E.5 for Archaeological information.

C.2i RANGE

Not applicable. There are no range tenures located in the FDUs covered by this FSP.

C.2j OTHER RESOURCES

Trapping / Guiding:

Trappers or guiding license holders in the area will be identified and notified through the Forest Stewardship Planning process.

Windthrow:

Windthrow hazard is **Low** for adjacent immature stands that were harvested in the past (10 – 15m tall)

Windthrow hazard is **Low to Moderate** for adjacent mature stands. The block contains dispersed internal retention and is relatively small in size. Mature stands surrounding the harvest area are similar to the block with moderately well to well drained soils, or are lower density stands with natural brush openings. Stands to the south drop away from the harvest boundaries on moderate to steep slopes, and stands to the north climb at steeper slopes than the block. These adjacent mature stands have already been partially exposed to winds from natural openings or previous harvest openings.

Soils contain moderate coarse fragments, are well drained, and have 53 cm rooting depth.

CONDITIONS NOT APPLICABLE TO THIS SITE PLAN

THE FOLLOWING CONDITIONS WERE CONSIDERED, AND FOUND NOT TO BE APPLICABLE TO THIS SITE PLAN:

None identified.

D. ECOLOGICAL INFORMATION AND SITE CHARACTERISTICS

D.1 STANDARDS UNITS AND CRITICAL SITE CONDITIONS

	BIOGEOCLIMATIC					
SU	**TREATMENT UNIT**	**ZONE**	**SUBZONE**	**VARIANT & PHASE**	**SITE SERIES**	**SITE TYPE**
A	1	ICH	dw	1	103_7104_3	-

E. MANAGEMENT STRATEGIES

E.1 RIPARIAN MANAGEMENT STRATEGIES

RIPARIAN RESERVE ZONE (RRZ)

RIPARIAN/ LAKE ID	RIPARIAN/ LAKE CLASS	HARVESTING Y/N	SU XREF	DESCRIPTION OF THE PURPOSE AND EXTENT OF REMOVAL OR MODIFICATION OF TREES AND ANY RELATED FOREST PRACTICES IN RIPARIAN RESERVE ZONE(S)
N/A				

RIPARIAN MANAGEMENT ZONE (RMZ)

RIPARIAN/ LAKE ID	HARVESTING Y/N	SU XREF	MANAGEMENT STRATEGIES FOR RIPARIAN OR LAKESHORE MANAGEMENT AREAS INCLUDING PROTECTING STREAM BANKS (if there is no RRZ), MAINTAINING SHADE, AND DEBRIS MANAGEMENT. IF FELLING AND/OR YARDING ACROSS STREAMS. INCLUDE EITHER THE RESIDUAL BASAL AREA OR DENSITY FOR RMZ (S) AND LMZ (S).
Haiseldean Creek (S6)	N	WTRA	Outside block. WTRAs 1, 2, and 3 completely reserve the 20m RMZ associated to this S6.

NON-CLASSIFIED (NC) RIPARIAN AREAS

RIPARIAN/ LAKE ID	SU XREF	MANAGEMENT STRATEGIES
NCD 12-1 NCD 12-2 NCD-12-3	WTRA	None. All located outside of the harvest area within WTRA.

E.2 FOREST HEALTH MANAGEMENT STRATEGIES

SU	Code	Nelson Region DRA Risk Factors	Points	Relative Risk	Comments
A	DRA	Site factors	**8**	H	• Armillaria is absent or present at low levels within the stand. Occurrence is likely opportunistic and compounded by other pathogens (DRN, DDE) weakening this stand. • The Nomographic Zones in Section 3.0 of the "Armillaria Root Disease Management Guidelines for the Nelson Forest Region" (June 1998) indicate that Alternative or Intensive deferred treatments for root disease management are appropriate for this site, should Armillaria become a problem. • Alternative treatments will include planting a species mixture that includes species tolerant and /or moderately susceptible to Armillaria (e.g.: Lw, Py, Pw). Fd (highly susceptible) may be included but should be limited to a maximum of 50% of the mix. Microsite selection should reflect buffer zones around infected stumps, if they can be identified. • Hand-pulling (preferred) or pop-up spacing (alternative) should be considered in the future should Armillaria become a limiting factor in meeting regeneration or free growing requirements (see section H). • Stumping or pushover harvesting treatments are not suitable due to low sign of Armillaria, and high soil hazards.
		Host factors	**6**	M	
		Inoculum potential	**0**	L	
		Disease factors	**11**	M	
			25	**M**	

Other Forest Health Factors

SU	Code	%	Comments	Current risk to inventory
A	IBD	1	Approximately 5% of stems show signs of IBD, of which nearly all are grey attack, with very little red or green attack noted. Several down Fd stems showed signs of IBD which corroborates with MoF AOS completed in 2017. Due to the presence of frass, beetles and pupae/larva the infestation is presumed to be ongoing at endemic levels. Due to the risk rating of the stand and the high consequence should an epidemic occur a treatment plan has been designed to manage the infestation. Funnel traps and subsequent trap trees in the area may be utilized if required based on the results of post-harvest spillover probes conducted by a Qualified Professional.	High

			Leave tree prescriptions require Douglas Fir that exhibits signs of stress, scarring, decay or general poor health are not to be selected for retention. Depending upon the severity of the infestation post-harvest, MCH packets may be applied to dispersed retention in areas of high IBD presence determined by the assessment of a Qualified Professional. Trap trees may be considered for beetle management if timing of road building and block harvesting permits. This is to be determined by a qualified professional.	
A	DSB	0	Pw is absent or present in minor amounts in the current stand. A small amount of Pw may be planted in SU A. Plant only rust resistant stock. Expect high incidence of white pine blister rust on any naturally regenerated Pw.	nil

Expected future risks and actions

A forest health/pest incidence assessment is not required. Forest health information was collected during SP field data collection in **June 2018**.

Stand health risks in the future include a warm aspect and possible moisture deficits during the growing season.

SU A: Timber type by volume of the pre-harvest stand is Fd_9Py_1(CwBgPlLw).

E.3 VEGETATION MANAGEMENT STRATEGIES

LIVESTOCK TO BE USED FOR VEGETATION MANAGEMENT: YES: ☐ NO: ☒

Current Brush Hazard: SU A: Moderate levels throughout the majority of the block with high levels of brush in small patches of open canopy scattered throughout the block and in openings outside of block.

Future Brush Hazard: High due to steep south facing slopes, and shallow rocky soil with dry brush complex. Potential competitor species include maple, alder, saskatoon, oceanspray, rose, and thimbleberry.

Brushing Methods: Should brushing become necessary, manual treatments are the preferred methods.

Risks and Considerations: Woody brushing or stand tending treatments must be carefully assessed due to pathogen ability to colonize wounds on stocked trees that may be damaged by brushing treatments.

Anticipated Timing: Treatment needs will be assessed through periodic walkthroughs and silviculture surveys. Treatment timing will be prescribed at the time of brush assessment.

E.4 COARSE WOODY DEBRIS (CWD) MANAGEMENT STRATEGIES

CWD levels are low (<3% ground cover). CWD is predominantly composed of 10-40cm diameter stems. Fd Pl Bg and Lw are the dominant CWD species. The stand has a dead standing and down component.

Manage for **minimum** CWD levels post-harvest in accordance with wildfire mitigation strategies. Post-harvest CWD will consist of non-merchantable existing levels and snags, along with residue and breakage. A reduction of CWD levels is anticipated through fire mitigation.

(FPPR Section 68): **Manage for the minimum of 4 logs per hectare,** each being at least **2 metres** in length and at least **7.5cm** in diameter at one end.

See the SITE PREP section (K.1) for additional CWD management strategies.

E.5 ARCHAEOLOGICAL IMPACT ASSESSMENT

Archaeological Overview Mapping of the **CP 410** area shows that **block 12** falls partially within a polygon that has a potential rating.

On July 16-17th, 2018, TMECS completed an archaeological field inspection under BC Heritage Inspection Permit 2018-0192 for CP410-12. No archaeological materials or sites were observed, recorded or are otherwise suspected within the proposed boundaries of the cut blocks in CP410.

F. SOIL CONSERVATION

F.1 SITE DISTURBANCE

	HAZARD RATINGS			SOIL CHARACTERISTICS		
SU	SOIL COMPACTION	SOIL DISPLACEMENT	SURFACE SOIL EROSION	DEPTH TO UNFAVOURABLE SUBSOIL (cm)		TYPE OF UNFAVOURABLE SUBSOIL
				MIN(cm)	MAX(cm)	
A	High	High	Moderate	42	42	Fragmental (>70% CF) and dense parent material.

F.2 SOIL DISTURBANCE LIMITS

SU A: ARE THERE SENSITIVE SOILS? ☐ YES ☒NO

MAX. PROPORTION OF TOTAL AREA UNDER THE PRESCRIPTION ALLOWED FOR PERMANENT ACCESS STRUCTURES (PAS): **4.7%.**

Roadside harvesting or temporary landings will be used.

DEACTIVATION OF PERMANENT ACCESS STRUCTURES: Any landings will be deactivated – debris will be piled & burned, water control will be installed around all landings.

Terrain Stability Assessment, Balfour Face, CP 410, Blocks 10, 11, 12, and 13 (report dated July 30, 2018)

Block 12, and the associated Spur 1, 2, and 4 roads, were reviewed by Christopher Perdue, P.Geo., Eng.L. of Perdue Geotechnical Services on July 6 & 9, 2018**.**

The likelihood of landslide initiation as a result of the proposed timber harvesting is rated as **Low**.

Recommendations from TSA: Seasonal groundwater emergence was identified along the cut bank of an historic, overgrown access road within the southwestern corner of the block with no surface drainage control measures along the in-block length. As a result, the section of the abandoned road within, immediately adjacent to and downslope of Block 12 should be rehabilitated concurrently with the completion of timber harvesting to restore natural drainage patterns.

General Timber Harvesting Recommendations are included in the TSA report and are noted on the Harvest Plan map.

SU	MAXIMUM ALLOWABLE SOIL DISTURBANCE WITHIN THE NET AREA TO REFOREST (%)	MAXIMUM EXTENT SOIL DISTURBANCE LIMITS MAY BE TEMPORARILY EXCEEDED TO CONSTRUCT TEMPORARY ACCESS STRUCTURES OR EXCAVATED OR BLADED TRAILS (%)
A	**10%**	**5%**

MASD for Roadside Work Areas: 25%

Any temporary access structures or excavated or bladed trails will be rehabilitated to the extent necessary to bring the SU net area back into compliance with the specified soil disturbance limits.

See **Section F.4** below for description of temporary access structures or excavated or bladed trails, if any.

Avoid harvesting during spring freshet/breakup conditions when soils are moist to reduce soil displacement and compaction.

Steep slopes >35% are present in parts of SU A and are noted on the **Harvest Plan Map.** In SU A ground based harvest methods will be utilized.

F.3 REHABILITATION TIME FOR TEMPORARY ACCESS STRUCTURES

MAXIMUM ALLOWABLE TIME TO COMPLETE REHAB (MEASURED FROM COMPLETION OF HARVEST): **1 YEAR**

F.4 MANAGEMENT STRATEGIES FOR TEMPORARY ACCESS STRUCTURES

SU	GENERAL LOCATION:	MAX ALLOWABLE HEIGHT OF CUTBANKS (m)	AVERAGE HEIGHT OF CUTBANKS (m)	EQUIPMENT TO BE USED (IF OTHER THAN EXCAVATOR)
A	Blading or excavating is expected to occur in parts of the unit with moderate to steep slopes.	0.8	0.3	Skidder, cat.

Existing Roads:

SU A: Balfour Face FSR = **0.1ha**

Proposed Roads (permanent):

SU A: Spur 1 = 204m x 10m = **0.20ha**
Spur 2 = 555m x 10m = **0.56ha**
Spur 4 = 139m x 10m = **0.14ha**
WTRA: Spur 1 = 148m x 10m =**0.15ha**
Spur 2 = 119m x 10m = **0.12ha**
Total PAS = **1.27ha**

Proposed Landings (temporary):

SU A: 5 landings @ 0.2 ha = **1.0 ha**

- **SU A: Roadside harvest with landings. Favourable skidding with minimal adverse skidding on the small area east of Haiseldean Creek.**
- **See Section E.1 for stream management strategies.**

The following will apply for any excavated/bladed trails that are required:

- Maximum trail width is 4m.
- Actual dimensions of bladed trails may vary depending on topography.
- The amount of bladed trail constructed will be kept to a minimum.

Short sections that become bladed trails where a non-bladed trail crosses a hump or ridge will be exempt from rehabilitation requirements provided that the soil disturbance limits in this SP are not exceeded.

Rehabilitation for bladed or excavated trails:

Any bladed or excavated trails will be rehabilitated as follows:

- De-compact the trail, including removing woody debris that is conducting subsurface moisture
- Place fill material that was sidecast on the excavated portion of the trail
- Re-contour the slope
- Re-establish natural surface drainage
- Place some woody debris over exposed mineral soil

G. SILVICULTURAL SYSTEMS

SILVICULTURAL SYSTEMS	
SU	SYSTEM / VARIANT / PHASE
A	Clear-cut with reserves silviculture system.
SU	STAND STRUCTURE AND SITE CONDITION - COMMENTS
A	Post-harvest stand structure will be even-aged with one age class. Planted trees and natural regeneration will include **Fd Lw Py (Pl Pw Cw Hw Bg)**. **3 Wildlife Tree Group Reserve Areas (WTRA):** totalling **8.5** ha **Leave Trees** **SU A: Retain 35-40 stems per hectare of Fd, Lw, and Py in the >=45 DBH classes** to provide stand structure, biodiversity, visual and wildlife values. Give preference to larger diameter, wind-firm dominants and/or vets. Individual stems may be removed if required for safety or operational reasons. Douglas-fir stems that exhibits signs of stress, scarring, decay or general poor health are not to be selected for retention. **Wildfire Mitigation** Py, Fd, and Lw are more likely to survive a fire than the other species on site. Thinning the stand from above while retaining fire resilient stems and minimizing the surface fuels to meet the minimum CWD requirements is a recognized fire mitigation management plan. The objective is to retain larger, healthy stems with live crowns while maintaining a 3-5-m spacing between the crowns. The larger leave trees have higher crowns, which means a longer distance between surface fuels and tree crowns; reducing the effective ladder fuels, and reducing the likelihood of the fire moving into the canopy. Regularly spaced leave trees will shade the understory, which will help reduce ground temperatures and prevent brush species from becoming established, further reducing the ladder fuels. Leave tree distribution is expected to be regular where large stems exist and is operationally feasible to do so. Adequate inter-crown spacing prevents the spread of a potential wildfire between leave trees, while still providing ground shading. Post harvest the stand will be easier to protect should a fire occur – fire will move more slowly through the stand due to less ground fuel, an open stand with clean ground & a more open canopy that will let more water and fire retardant through to the ground from air drops than a full canopy stand. The roads and trails constructed to access the block will provide better access for the fire fighters. The current stand is heavy to Fd; therefore planting Lw & Py will make the stand more resilient to adapt to changing climate conditions & to adapt to species specific pest. **Snags** No snags or stubbed trees are prescribed to be left behind in the block, as they are a hazard from a fire management perspective. Live vets and larger stems selected as leave trees will provide wildlife values post-harvest.

H. STOCKING REQUIREMENTS

LICENCE #	CP	BLOCK	OPENING NUMBER	LOCATION
A30171	410	12	82F066	Balfour Face

H1 ECOLOGICAL INFORMATION

SU	Net Area (ha)	Zone	Subzone	Variant/ Phase	Site Series (complex - %)	Elevation			Slope position	Soil Texture (0-30cm)
						Min	Max	Avg		
A	17.9	ICH	dw	1	$103_{7}104_{3}$	845	1160	1005	Middle	L

RATIONALE FOR STOCKING STANDARD FSP ID SELECTION

STANDARDS UNIT FSP ID #	CHANGE FROM STANDARD PRACTICE	COMMENT: (For example: Forest health (DRA) or Rocky site)
1057450	N/A	

H2 STOCKING REQUIREMENTS FOR SILVICULTURAL SYSTEMS OTHER THAN SINGLE TREE SELECTION

Standard unit	Standards ID	Regen Delay (yrs)	Free Growing Early (yrs)	Free Growing Late (yrs)
A	1057450	7	12	20

Preferred Species		Acceptable Species		Post Spacing Density (sph)				Max Coniferous (sph)
Species	min ht (m)	Species	min ht (m)	Min	500	Max	1600	10,000
Fd Lw Py	Fd- 1.0, Lw- 1.4, Py- 0.8	Pl^{13} Pw^{31}	Pl, Pw- 1.4	Well Spaced Trees (sph)				
				Target	Minimum pref&acc	Minimum preferred	Min Horizontal Inter-tree distance (m)	
				1000	500	400	2.0*	
						Height Relative to Competition (%)		
						150		

Other Required Stocking Information/Footnotes :

13 - suitable at upper elevations

31 - must use of blister rust resistant stock. See BC Journal of Ecosystems and Management 10(1): 97-100 for supplementary information.

* - a reduced MITD of 1.7m may be used to facilitate planting superior microsites, when sites have: mechanical site preparation (mounding and disk trenching), been previously fill planted, or conditions where obstacle planting for snow creep is necessary. Reduced MITD applies to PLANTED TREES ONLY

H3 SITE PREPARATION

Area (ha)	TECHNIQUE (S) / LIMITING FACTORS
A 17.9	Options for SU A include: • Mechanical bunching (pile and burn) where feasible to minimize CWD (surface fuels) as a method of wildfire mitigation. • Up to 10% of piles may be left unburned in order to contribute to wildlife habitat and coarse woody debris values. • Manage CWD and slash with a goal of future wildfire mitigation; minimize surface fuels post-harvest. Clearcutting and site prep that removes almost all of the aboveground biomass creates a good firebreak given the limited fuel remaining. This will reduce the intensity of a potential fire, and make it easier for firefighters to suppress. This does not mean removing all organic material down to mineral soil; just to reduce significant accumulations of surface fuel.

H4 PLANTING

SU	Area (ha)	Regen. Method	Species	Age	Stock Type	Season	Stems/Ha	Total Stems
A	17.9	Plant	FdLwPy(PlPw)	1+0	PSB 412A/410	Spring	1200-1400	26400-30800

LIMITING FACTORS / COMMENTS:

- Plant on the high or low side of obstacles to minimize snow creep and snow press.
- Significant amounts of natural regen of Bg and Hw exist within certain areas the block. Expect quantities of natural regeneration.
- Manage for a high diversity of planted trees as a climate change adaptation strategy. Increasing species diversity may help buffer the negative impacts of climate change, and make forests more resilient when faced with extreme weather events. This strategy is meant to reduce the forest health risks to future timber supply by providing a diversity of species should one or more become susceptible to pests or other damaging agents.

  CP410 is currently very heavy to Fd. Replanting these stands with a higher diversity of species, including species that are more adapted to hotter and drier growing conditions like Lw and Py, will promote a stand that is more likely to tolerate a warming climate.
- Microsite selection for Lw, Pl, and Py should be concentrated to dry sites.
- Limiting factors include a warm aspect and shallow soils. Moisture deficits are expected to persist through the summer.
- Plant as soon as possible following harvesting or site prep operations. **Note:** a post-harvest assessment should be completed to assess the necessity of site preparation prior to planting. If site prep is needed, the person completing the assessment will generate a prescription surrounding the areas that are required and the methods to be employed.
- Anticipated Timing/Constraints: Treatment needs will be assessed through periodic walkthroughs and silviculture surveys.
- Monitor for signs of ungulate browse during silviculture surveys.

H5 BRUSHING / STAND TENDING

Area (ha)	TECHNIQUE (S) / LIMITING FACTORS
17.9	Brush hazard: Current hazard is moderate due to subxeric moisture regime and dry brush complex in adjacent openings. Future brush hazard is high due to dry aspect and shallow rocky soil with dry brush complex. Competitor species post-harvest include thimbleberry and woody shrubs such as alder, maple and willow. Brushing Methods: Manual treatments are preferred. However, existing pathogens spread by colonizing wounds on stocked trees and care must be taken to limit damage to crop trees. Woody brushing may be necessary prior to Free Growing and likely is an option in pathogen management, as long as crop trees are not injured. Anticipated Timing/Constraints: Treatment needs will be assessed through periodic walkthroughs and silviculture surveys. Treatment timing will be prescribed at the time of brush assessment.

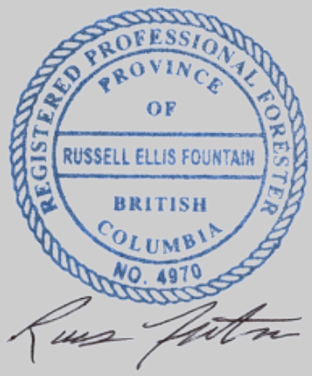
I. ADMINISTRATION

SITE PLAN PREPARED BY (RPF SIGNATURE AND SEAL):

Russell Fountain

RPF Name (Printed)

Date: September 28, 2018 RPF #: 4970



RPF Signature and Seal

SITE PLAN ATTACHMENTS:

- ☑ SP MAP(S)
- ☑ ARCHAEOLOGICAL IMPACT ASSESSMENT
- ☑ TERRAIN STABILITY FIELD ASSESSMENT
- ☑ VISUAL IMPACT ASSESSMENT
- ☐ RIPARIAN ASSESSMENT
- ☐ FOREST HEALTH / PEST INCIDENCE ASSESSMENT
- ☐ SOIL CONSERVATION TABLE
- ☑ OTHER: REFORESTATION PRESCRIPTION
- ☑ OTHER: ARMILLARIA RISK ASSESSMENT MATRIX

MAJOR LICENSEE SIGNING AUTHORITY:

Licence Holder Signing Authority Signature

Licence Holder Signing Authority Name (Printed)

Date: _____

	Standards Units					
	A				**TOTAL HA**	**%**
HAZARD RATINGS:						
Compaction	High					
Soil Displacement	High (16)					
Surface Erosion	Moderate (19)					
Forest Floor Displacement	High (15)					
Mass Wasting	Moderate (16)					
Harvest System	Conventional					
TOTAL AREA	27.7				27.7	
Wildlife Tree Patches / NP Nat						% WTP/IMM
WTRA	8.5				8.5	30.7
IMM	-				-	-
Permanent Access Structures						% Disturbance
Proposed roads	1.2				1.2	4.3
Existing roads	0.1				0.1	0.4
Landings	-					
Total disturbance permanent access structures	**1.3**				**1.3**	**4.7**
NET AREA TO BE REFORESTED	**17.9**				**17.9**	
Sensitive Soils (Y/N)	No					
Temporary Access Structures: Road, landing, excavated or bladed trails that will be rehabilitated (% of NAR).	5% (excavated/bladed trails)					
Max. Allowable dispersed Soil Disturbance (% of NAR by Standards Unit) as a result of harvesting, mechanical site preparation, or hazard abatement activities.	10%					

Comments: Landings within the NAR are temporary and will be fully rehabilitated.

Rehabilitation/Deactivation measures:

All landings and trails within the NAR are temporary and will be rehabilitated by decompacting, re-contouring, surface restoration, followed by planting.

Landings will be deactivated as per the following: Minimize runoff flowing onto the landing and minimize erosion of the landing fill material by incorporating appropriate drainage systems. If required, carry out measures to ensure that the landing is stable, such as decompaction, re-contouring, and grass seeding.

Perm Road (existing): 0.1ha
Perm Road (proposed): 1165m x 10m = 1.2ha
Temp Road: N/A
Temp Landings: 5 temporary landings utilizing new access structures. Total of five 0.2 ha landings within SU A NAR.

See **Section F.4** for discussion of rehabilitation of excavated/bladed trails.