INTERFOR

ANCILLARY INFORMATION-Site Plan (original)

North Island Replacement Forest Stewardship Plan

A. TENURE IDENTIFICATION

LICENCE NO:	CP:	BLOCK NO:	LICENSEE NAME:
T0193	**TBA**	**KLEK2D**	**Interfor Corporation**
TOTAL AREA UNDER PLAN (ha): 6.3	MAPSHEET: 92E069		LOCATION: Kleeptee Creek
GROSS HARVEST AREA (ha): 5.9	REGION: West Coast Region DISTRICT: Campbell River Forest District		LOCATION COORDINATES: Latitude: 49^0 40' 2" Longitude: 126^0 20' 18"

B. AREA SUMMARY

AREA (ha)							
SU	TOTAL AREA UNDER PLAN (TAUP)	PERMANENT ACCESS		NP NAT (brush)	RESERVES	WTR	NET AREA TO BE REFORESTED (NAR)
		ROADS	OTHER				
1	5.9	0.4	---	---	---	---	5.5
WTR	0.4	---	---	---	---	0.4	---
TOTAL	**6.3**	**0.4**	**0.0**	**0.0**	**0.0**	**0.4**	**5.5**

C. ECOLOGICAL INFORMATION AND AREA DESCRIPTION

C.1 ECOLOGY

SU	ELEVATION (m)		BIOGEOCLIMATIC CLASSIFICATION			
	RANGE	AVG.	ZONE	SUBZONE / VARIANT	SITE SERIES	GRID LOCATION
1	310-460	370	CWH	vm1	01 80% / 05 20%	4 / C-D

C.2 AREA DESCRIPTION

1	SU 1 is located on moderately well to well drained steep slopes between **30-90%** and averaging 70%. The topography has long slopes broken up by rock outcrops and small benches. The SU has a west facing aspect. The overstory stand is dominated by Hw, Cw and Ba. The regeneration is moderate and consists of Hw and Ba. The shrub layer is dominated by *vaccinium* spp with scattered salal in the more open areas, false azalea, and Salmonberry in draws and streams. The herb layer has deer fern with scattered sword fern and spinywood fern. Mosses are predominantly Oregan-beaked, lanky and step. The soils are fSL (fine sandy loam). LFH layer is a more humus type. Soil depth averages 40-50cm and the CFC are semi-angular and range from 50-80%.

C.3 PREVIOUS STAND CHARACTERISTICS

SITE UNIT	STAND TYPE	SPECIES	AGE CLASS	HEIGHT CLASS	STOCKING CLASS	Site Index / Source (Source: Forest Cover Polygon / Code: H)
SU 1	MAT	CwHwBa	9	4	1	26

D. LAND USE OBJECTIVES – FSP S. 1.6.1

D.1 LANDSCAPE UNIT PLANS

This block is located within the Kleeptee LU. Therefore, the Landscape Unit Objectives for the Sayward LU do not apply.

D.2 NON-SPATIAL OLD GROWTH OBJECTIVES

The old-growth retention target for the Kleeptee LU (Low BEO) within the CWH vm1 is 13% (Regional Landscape Unit Planning (RLUP) Database v3.2, August 15, 2005). Draft OGMAs that meet the intent of the NSOG Order have been delineated but are not established / final. The north end of block KLEK2D is located adjacent to draft OGMA Klee_037. The development of this block will not impact the OGMA. Road Construction and harvesting activities within this block are in compliance with the Order and consistent with FSP S. 1.6.1.2.

D.3 VANCOUVER ISLAND LAND USE PLAN

The Vancouver Island Land Use Plan (VILUP) higher-level plan applies to the North Island FSP area. The block is located within the Kleeptee Enhanced Resource Management Zone (RMZ 23) in which Higher Level Plan objectives 7, 8, 9 and 9.1 may be applied.

Objective 7: According to the North Island FSP, the FSP Holder may harvest cutblocks and construct roads within cutblocks that apply any silviculture system; exceed 40 ha; and are adjacent to areas that are greened up, as per VILUP HLP Objective 7 (b). The gross harvest area of KLEK2D is 5.9 ha. It is located adjacent to non-conforming blocks K3(8.2ha), K2 (7.6 ha), and proposed K2H (2.3 ha) resulting in a total opening of 24 ha. Objective 7 is not applicable.

Objective 8: To avoid or mitigate adverse hydrological impacts in watersheds with significant watershed sensitivity and significant fisheries values as related to 7(a). The Kleeptee watershed is not identified as having significant fisheries values and does not have any indicators of being significantly sensitive. Block KLEK2D is not greater than 40 ha and 7(a) is not applicable.

Objective 9: Objective 9 states that a single species that is ecologically suited to an area may be selected for reforestation if a mix of species was present on the area before the timber was harvested. Cw and Ba will be planted post-harvest and Obj. 9 is not applicable.

Objective 9.1: Objective 9.1 limits the area that may be subject to a single species (i.e. objective 9) to no more than 20 percent of the forested area of any variant within a given Enhanced Forestry Zone. Obj. 9 is not being utilized therefor Obj. 9.1 is not applicable.

E. SOILS – FSP S. 1.6.2.1

E.1 SOIL HAZARD RATINGS

HAZARD RATINGS – if logging methods other than cable or aerial are proposed
(a high or very high rating in any category is considered a sensitive soil)

SU	SOIL COMPACTION	SOIL DISPLACEMENT	SURFACE EROSION
1	M	VH	VH

NOTE: Proposed harvest method is via a mix of cable and ground based yarding. The hazard ratings have been provided in order to determine soil sensitivity only.

E.2 SOIL DISTURBANCE LIMITS

SU	MAXIMUM ALLOWABLE SOIL DISTURBANCE WITHIN THE NET AREA TO BE REFORESTED (%)
1	5

Cable Yarding –
Avoid ground scour; plan yarding roads with good clearance for the grapple and butt ends.
Ensure tail holds are well anchored and tie back to multiple anchor points if necessary.
Manage slash accumulations such that natural surface drainage patterns can be maintained,

E.3 PERMANENT ACCESS STRUCTURE LIMITS

The estimated Permanent Access Structure (PAS) associated with block KLEK2D is 0.4 ha or 6.8% of the gross block area (5.9 ha) meeting the 7% requirement as per FPPR section 36.

E.4 MANAGEMENT STRATEGIES FOR TEMPORARY ACCESS STRUCTURES

No temporary access structures are planned for use within this block.

E.5 REHABILITATION FOR TEMPORARY ACCESS STRUCTURES

MAXIMUM ALLOWABLE TIME TO COMPLETE REHABILITATION (MEASURED FROM COMPLETION OF HARVEST): N/A

E.6 TERRAIN STABILITY

A Terrain Stability Assessment was completed by Onsite Engineering Ltd. January 30, 2018.

The terrain in block KLEK2D is accessed as having a low to moderate likelihood for landslide initiation. The following recommendations have been made to reduce the risk and will apply to the entire block:

- Ensure tailholds are well anchored; tie back to multiple anchor points if necessary.
- Avoid altering surface and subsurface drainage patterns

- In the yarding phase, ensure grapple and butt ends have good clearance to minimize scouring and rutting the forest floor.
- Ensure slash piles do not alter surface drainage. Ensure ditches and culverts are free of logging debris and are always functioning properly.

- Follow reduced rainfall shutdown criteria within and below areas of moderate landslide hazard.

Steam 4A has a moderate transport potential fall and yard away where safe and practicable. Avoid limbing and bucking within the channel.

Alert workers of a rock dislodgement hazard that exists overhead and underfoot along the upper boundary of the block.

Special road construction recommendations have been made to the design to reduce road related landslide hazards to low. See TSA report for details.

E.7 WINDTHROW

A windthrow assessment was completed for KLEK2D on January 22, 2018 that resulted in a low risk of windthrow for the block.

Minor evidence of windthrow was noted within the block and next to the adjacent previously harvested blocks. The dominant winds are from the South and Southeast. No treatment is recommended.

Minor windthrow is expected and will be managed as coarse woody debris.

F. WILDLIFE – FSP S. 1.6.2.2

F.1 WILDLIFE

There are no established Ungulate Winter Ranges (UWR) within the vicinity of this block. There is one Wildlife Habitat Area (WHA), 1-583b located adjacent to the north end of the block. Harvesting of the block will not affect the WHA.

Marbled Murrelet (*B. marmoratus*) – Marbled Murrelet (MAMU) are known to exist in the FSP area. Block KLEK2D contains suitable type 3 MAMU habitat as per the heli-survey completed in the area. According to the North Island MAMU Habitat calculations completed June 2016 the defined amount required by the Notice has been met in the Kleeptee Landscape Unit. The harvesting of the type 3 habitat in this block will not affect the amount required by the Notice to be met.

Great Blue Heron *(Ardea herodias fannini)* – There is potential for Great Blue Heron foraging locations within 10km of the proposed harvest area (ocean, lakes); however, no occupied habitat was found within or adjacent to the block.

Red-legged Frog *(Rana aurora)* – No occupied habitat was identified. As per the Accounts and Measures for Managing Identified Wildlife - Accounts V.2004, there is no highly suitable habitat (breeding habitat) within or adjacent the harvest area. There are no lakes or wetlands within close vicinity of the block. For terrestrial habitat, red legged frogs use a variety of seral stage forests (young, mid, old seral) which are abundant in the landscape unit.

Keen's Long-eared Myotis *(Myotis keenii)* – No occupied habitat was identified. As per the Accounts and Measures for Managing Identified Wildlife – Accounts V.2004, there is no highly suitable habitat within or adjacent to the block.

G. WATER, FISH, WILDLIFE AND BIODIVERSITY WITHIN RIPARIAN AREAS – FSP S. 16.2.3

G.1 FISH

The objective of this plan is to maintain stream bank integrity and protect water quality through the management of the Riparian Management Area (RMA). Refer to section G.2 for riparian management strategies. Streams within these blocks have been classified in accordance with FPPR S. 47. The streams within this block are indirect tributaries of the Kleeptee River, a S1 Fish stream, as classified by D,R, Clough Consulting (various reports 2001-2017)

G.2 RIPARIAN MANAGEMENT STRATEGIES

RIPARIAN MANAGEMENT ZONE (RMZ)

STREAM / LAKE I.D.	STREAM / LAKE CLASS	HARVESTING Y/N	GULLY Y/N	MANAGEMENT STRATEGIES FOR STREAM 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).
17	S5	Y-RMA	N	This stream is classified in the field as S5 and has a 30 m RMZ. Where the RMZ of this stream overlaps the boundary it will be harvested to maintain operational feasibility and safety requirements. A minimum 10 m buffer has been maintained adjacent to the stream, in which 100% of the basal area will be retained. **Fall and yard away.**

4A	S6	Y	N	These streams are classified in the field as S6 and have 20 m RMZs. The RMZs of these streams will be harvested to maintain operational feasibility and safety requirements. Basal area retention within the RMZs is not required. **Fall and yard away. Avoid limbing and bucking within the streams to minimize debris inputs.**
3A, 5	S6	Y	N	These streams are classified in the field as S6 and have 20 m RMZs. The RMZs of these streams will be harvested to maintain operational feasibility and safety requirements. Basal area retention within the RMZs is not required. **Cross-stream falling and yarding will occur. Avoid limbing and bucking within the streams to minimize debris inputs.**
ALL	S6	Y	N	Embedded CWD will be left in place to maintain stream bank integrity. Remove introduced logging debris that may cause stream blockages concurrent with harvesting. Removal of additional, inadvertently deposited debris/slash will be done if the final or interim Phase Inspection Report (PIR) deems it necessary.
FPPR 52(2)	Section 52(2) applies as Stream 17 is a direct tributary to a S1 stream. The stream is located outside of the block 10 meters or more, and the stream bank and channel will not be impacted by harvesting.			
FPPR 50(1)	Section 50(1) does not require an RMA encroachment rationale as the road construction within the RMAs in this block is associated with stream crossings as per 50(1)c.			

H. COMMUNITY WATERSHEDS – FSP S. 16.2.4

H.1 COMMUNITY WATERSHEDS
This block is not located within a designated Community Watershed. No community or domestic water supplies are located near this block.

I. WILDLIFE AND BIODIVERSITY – FSP S. 16.2.5

I.1 BIODIVERSITY
I.1a LANDSCAPE-LEVEL BIODIVERSITY
The gross harvest area of KLEK2D is 5.9 ha. It is located adjacent to non-conforming blocks K3(8.2ha) and K2 (7.6 ha) resulting in a total opening of 21.7 ha. The block meets FPPR S.64 and S.65.
I.1b STAND-LEVEL BIODIVERSITY
Block KLEK2D is located within the Kleeptee Landscape Unit (LU) –Low Biodiversity Emphasis Option (BEO). The wildlife tree retention (WTR) requirement within the Kleeptee LU – is 7% (minimum) of the gross harvest area as per FPPR s.66. A 0.4 ha WTR patch has been established in association with this block meeting the above requirement.

J. CULTURAL HERITAGE RESOURCES – FSP S. 1.6.2.6

J.1 CULTURAL HERITAGE
This block is located in the asserted traditional territory of the Muchalaht Mowachaht First Nation.
J.2 MANAGEMENT STRATEGIES FOR CULTURAL HERITAGE RESOURCES / ARCHAEOLOGICAL SITES
Information sharing with the Muchalaht Mowachaht First Nation was carried out between June 2, 2017 and December 5, 2017. Questions regarding fish streams within the area were asked and answered during information sharing, no further concerns were identified. If any previously unidentified cultural heritage resources are *discovered* during harvesting, stop work and notify supervisor and/or Interfor personnel.

K. VISUAL QUALITY OBJECTIVES – FSP S. 1.6.4.1

K.1 VISUAL RESOURCE MANAGEMENT
Block KLEK2D is located within a "Known Scenic Area" with a VQO of partial retention. A Visual Impact Assessment was completed by Wendy Ravai, RPF and Lauren Thompson, RPF, February 2, 2018. The assessment used 7 viewpoints, of which, KLEK2D is visible from 4. The block is small (6.3ha), easy to see in all visible viewpoints, and irregular in shape meeting the definition of partial retention, such that the alteration is easy to see, small to moderate in scale and has a design that appears natural and is not angular or geometric. The percent landform alteration from the visible viewpoints is 5.2%, 5.5%, 6.5% and 6.8% meeting the recommended visual alteration of 1.5-7%.

L. INVASIVE PLANTS – FSP S. 1.8

L.1 INVASIVE PLANTS
No invasive plants were noted within or adjacent to the plan area. The risk of establishment and/or spread of invasive plant species are deemed to be low. Site disturbance greater than 0.1 ha contiguous area will be assessed post harvest for treatment. Prompt reforestation should suppress shade intolerant invasive plants.

M. MANAGEMENT STRATEGIES

M.1 FOREST HEALTH MANAGEMENT STRATEGIES
Interfor has recorded and evaluated the occurrence of detected forest health factors currently causing damage or which may cause damage in the area under the site plan. A low to moderate incidence of Hemlock Dwarf Mistletoe (DMH) was noted throughout the block. *The 3 m knockdown rule will apply to this block.* The primary focus for reforestation in this block will be non-host species (BaCw).
M.2 COARSE WOODY DEBRIS MANAGEMENT STRATEGIES
CWD will be retained for soil conservation, retention of nutrient capital and wildlife habitat considerations. The residue from harvesting (including tops, limbs, low-grade logs and non-merchantable material) will make up the majority of CWD retained over the rotation.

N. SILVICULTURAL SYSTEMS

SU	SILVICULTURAL SYSTEM & METHOD	Basal Area % Retention	Maximum stems per hectare retained	Minimum stems per hectare retained	Variable Retention Type
1	Clearcut with reserves	---	---	---	---
SU	COMMENTS				
1	STAND STRUCTURE AND SITE CONDITION:	Block KLEK2D is located within the side valley of Kleeptee Creek. The pre-harvest stand is old growth Cw(56%), Hw (38%) and Ba (6%) based on the cruise.			
1	LEAVE TREE SPECIES AND FUNCTION:	Block KLEK2D will be harvested using clearcut with reserves. A total of 0.4 ha will be retained in WTR in association with the block. It is composed of timber that is of similar age and stand attributes as that which is being harvested and will provide structural stand diversity, mature stand attributes in the regenerating stand, future CWD, and a source of future wildlife trees in order to meet biodiversity objectives.			

O. STOCKING STANDARDS – FSP S. 1.7

O.1 STOCKING STANDARDS

SU	NAR (ha)	MOF ID#	SPECIES (*) ECOLOGICALLY SUITABLE SPECIES (height-m)	WELL SPACED TREES/HA TSS (sph)	WELL SPACED TREES/HA MSS (sph)	MINIMUM INTERTREE SPACING (m)	REGEN DELAY (years)	LATE FREE GROWING (years)
1	5.5	1052731	Cw / 1.5 Hw / 3.0 **Ss** / 3.0 Ba / 1.8 Fdc/ 3.0	900	500	2.0	6	20

(*) FOOTNOTES - AS PER FSP STOCKING STANDARDS – TABLE 2 (STANDARDS FOR EVEN-AGED STANDS):

All	**Ss** – risk of weevil damage use weevil resistant seedlings.

P. SILVICULTURE PLAN

P.1 SILVICULTURE PLAN

All seed and vegetative material used in accomplishing this plan will be used in accordance to the Chief Forester's Standards for Seed Use (November 2004) and Changes to Seed Transfer Limits (2009). New Climate Based Seed Transfer Guidelines (CBST) may also be applied after April 1, 2018.

SU 1 **CWH vm1 01 site series leading**

Reforestation: PLANT

Prompt planting of 900 sph Cw (80%) and Ba (20%) in year one (post-harvest) is recommended in order to meet regeneration delay early. A 412/410 A/B stock type mix is recommended as the area has shallower soils in areas. Planting of Cw should be focused on benches and wetter areas. Hw can be expected to regenerate naturally post-harvest and supplement the planted stocking.

Fertilization at time-of-plant is not recommended.

Seedling protectors may be required as Cw Elk browse has been observed in the area.

Vegetation Management Strategies:

SU 1 has a low brush hazard (L). A salal – shrub complex can be expected to develop. Competing vegetation will be monitored during scheduled surveys. If the survey indicates that competing vegetation will impede planting, regeneration and/or free-growing obligations from being met a brushing treatment will be scheduled.

P.2 SEEDLING REQUIREMENTS

SU / Type	NAR (ha)	Species	Age Class	Stock Type	Seed Zone	Elevation (m)	Trees per ha	Total Trees
1 / PLT	5.5	Cw Ba	1+0	412/410 A/B	M	2~~10-320~~ 310-460	**720** **180**	3,960 990

ADMINISTRATION

ANCILLARY INFORMATION PREPARED BY (RPF SIGNATURE AND SEAL):

Fieldwork and Document by: Wendy Ravai, RPF

REGISTERED PROFESSIONAL FORESTER
PROVINCE OF
WENDY RAVAI
BRITISH COLUMBIA
NO. 4040

Wendy Ravai, RPF
RPF Name (Printed)

RPF Signature and Seal

Date: March 26, 2018

ANCILLIARY DOCUMENTS ON FILE:

- ☑ 1:5000 SITE PLAN MAP
- ☑ FIELD DATA CARDS (e.g., SP cards, forest health evaluations, site information, plantability, etc.)
- ☑ TERRAIN STABILITY ASSESSMENT
- ☑ FIRST NATION INFORMATION SHARING
- ☐ ARCHAEOLOGICAL ASSESSMENT
- ☑ VISUAL ASSESSMENT
- ☑ SOIL HAZARD ASSESSMENT
- ☐ RIPARIAN ASSESSMENT
- ☑ RIPARIAN SUMMARY
- ☑ MAMU SUMMARY
- ☑ OGMA SUMMARY
- ☐ OGMA REPLACEMENT RATIONALE
- ☐ FOREST HEALTH / PEST INCIDENCE ASSESSMENT
- ☑ CRUISE SUMMARY
- ☑ WINDTHROW ASSESSMENT