

PINE/CANYON TIMBER HARVEST PROJECT

**(CHAMPAGNE AND AISHIHIK TRADITIONAL TERRITORY
TIMBER HARVEST PROJECT WITHIN THE PINE LAKE AND
CANYON LANDSCAPE UNITS)**



**FOREST MANAGEMENT BRANCH
ENERGY MINES AND RESOURCES
YUKON GOVERNMENT**

and

CHAMPAGNE AND AISHIHIK FIRST NATIONS

**with technical assessment and support from
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**CATT TIMBER HARVEST PROJECT FOR THE PINE LAKE AND CANYON
LANDSCAPE UNITS**

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Executive Summary

This document represents the first Timber Harvest Project under the implementation of the Strategic Forest Management Plan (SFMP, 2004) for the Champagne and Aishihik Traditional Territory, with guidance from the Integrated Landscape Plan (ILP, 2007). The harvest areas described here, combined with those developed under the Quill Creek Bench Forest Development Plan (2005) form a portion of the million cubic metres which was announced as the available harvest level for the CAFN traditional territory. The project is consistent with the goals and objectives of the SFMP and according to the priorities and guidelines of the ILP.

The target volume of this project is approximately 250,000 cubic metres of beetle infected timber and targets stands comprised of at least 30% mortality due to spruce bark beetles. The planning area is generally north of the Dezadeash River between Canyon and Haines Junction, then northwest of the Alaska Highway to Bear Creek.

Nineteen blocks have been identified, including five located on CAFN settlement lands. This represents the first time timber harvest areas have been identified for development on first nation settlement land as a result of a strategic planning process in the Yukon.

The objectives of this project were to create harvesting opportunities to facilitate forestry-based economic opportunities and the abatement of the fire hazard associated spruce bark beetle affected forest in the CAFN traditional territory. All nineteen blocks are located in fuel abatement “landscape” zones. A parallel planning process with more specific objectives for fuel abatement will identify treatment areas, and potential timber harvest areas, within “interface” zones which are in much closer proximity to communities.

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1.0 INTRODUCTION

Champagne and Aishihik First Nations (CAFN) and Yukon Territorial Governments (YTG) approved the Integrated Landscape Plan for the non-overlap Traditional Territory of the CAFN in early 2007. The Integrated Landscape Plan (ILP) identified areas where Timber Harvest Projects can be planned out, priorities for management zones, and guidelines for sustainable Timber Harvest Project planning.

This project area encompasses the Landscape Fire Abatement Sub-zone within the Pine Lake and Canyon Landscape Units. This candidate area was chosen based on a range of criteria including planning direction from the Strategic Forest Management Plan, and a desire to reduce access development.

All blocks assessed for harvesting opportunity have been attacked by the spruce bark beetle (*Dendroctonus rufipennis*). Cruise data indicates that, on average, 69% of the mature merchantable spruce trees are attacked by beetles, of which, 83% are dead. .

Out of the 45,411 forested hectares in the combined Canyon and Pine Lake Landscape Units (LU's), 19 harvest blocks were identified for development. The total combined area of these blocks is 2,954 hectares. The gross area was reduced considerably with the inclusion of wildlife buffers, riparian buffers, visual buffers, other buffers and in-block reserves (group retention patches), to a net operable area of 1,959.2 hectares (or 66.3% of the total size of the areas of interest). The footprint of the net operable area is 4.3% of the forested area of the two Landscape Units combined, with an estimated net harvestable volume of 254,197 m³.

Five of the nineteen blocks are on CAFN Settlement Lands. The estimated volume from these blocks is 44,499 m³ (17.5% of the total) from 722.7 hectares.

1.1 Background

1.1.1 Spruce Bark Beetle mortality

The Champagne and Aishihik First Nations traditional territory has been the centre of one of the largest spruce bark beetle outbreaks in Canadian history. Since the early 1990s, approximately 364,000 hectares of forest in the Southwest Yukon have been affected by this beetle outbreak. The most recent assessment of beetle activity suggests the outbreak is finally nearing the end of its duration (NRCAN; YG-EMR 2007).

1.1.2. Forest Planning Context

This Timber Harvest Project is an outcome of the forestry planning processes that have been in progress for many years by CAFN, the Yukon Government and the Alsek Renewable Resource Council. The following historical context provides the relevant background for this project. This historical context highlights the upper level plans, related plans and agreements that provide direction for this project. They are organized chronologically.

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- *Letter of Understanding (CAFN, YG, DIAND, ARRC: 1998);*
[Agreement to coordinate the development, adoption and implementation of a regional forest management plan]
- *Devolution Transfer Agreement (2003);*
[Forest Resources on Yukon Lands delegated to Yukon Government from Federal Dept.]
- *Implementation Agreement (CAFN-YG; March 2004)*
[Agreement to focus the SFMP on three planning objectives, namely;
 - forest fuel abatement around affected communities
 - re-establish a healthy and vigorous forest
 - examine economic opportunities]
- *Strategic Forest Management Plan for the CAFN TT (December 2004)*
[The strategic plan identifies the main management priorities, and general goals and objectives for sustainable forest management]
- *Terms of Reference for Steering Group and Technical Working Groups (2004)*
[Identifies the roles and responsibilities of supporting staff for cooperative management with CAFN and YG and other strategic partners. Identifies the Steering Group as the primary decision-making body and the technical working groups for the various requirements for plan implementation]
- *Quill Creek Harvest Development Plan (Interim Wood Supply Plan) (2005)*
[The Quill Creek Harvest Development Plan was completed in 2005. The intent of this plan was to provide a local wood supply for roundwood and fuelwood for a three to five year window, while the subsequent SMFP based plans were being developed (i.e. the Integrated Landscape Plan).
- *Allowable Harvest Level (March 2006)*
[The allowable harvest level was developed through assessing various management scenarios. The selected harvest level was based on the allowable planning area and applying draft ILP management assumptions for netdown of available volumes]
- *Final Integrated Landscape Plan (Feb. 2007)*
[The ILP review committee developed a condensed version of the ILP and the Steering Group provided the final approval of this plan for use in timber harvest projects. The majority of draft guidelines were maintained, and a clearer set of management priorities were provided].

1.2 Timber Harvest Project Planning Area Identification

The timber harvest project planning area is defined as the area within the Pine Lake and Canyon Landscape Units (SFMP Planning Areas), and all within the Landscape Fuel Abatement Sub-zone (Integrated Landscape Plan) (see Appendix A, 1:50,000 Overview Map under separate cover). This area was recommended as the next area for timber harvest project planning by both CAFN and YG. The selection was based on SFMP strategic priorities for these areas, the minimal requirements for access development, economic costs of development, and the ILP management

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priorities for fuel abatement in and around communities (i.e. Haines Junction, Canyon).

The Interface Zone, in direct proximity to communities, is considered first priority but was not considered part of this project. These areas are being planned under individual community Fuel Abatement Plans that may provide additional timber harvest opportunities.

1.3 Summary of Areas-of-Interest (Timber Harvest Blocks)

Areas of harvesting opportunity were first identified as “Areas of Interest” through the reconnaissance survey phase and are now referred to as blocks. Each of these areas is of generally uniform timber types of high potential for timber harvest opportunity (also referred to as “gross operable area”). The Integrated Landscape Plan directs timber harvest projects to focus on areas of higher volume, areas that may provide fuel abatement potential and avoid areas that may be of concern for other management objectives. In addition, the reconnaissance survey identified site conditions, operational constraints and resource concerns that could be impacted by development. Additional recommendations for landscape level planning were provided through an interagency assessment of wildlife connectivity planning. Harvest blocks identified for development under this project are consistent with those recommendations (see: *Habitat Connectivity Planning Recommendations for Forest Planning in the CAFN Traditional Territory, May, 2008* for further details).

A joint crew involving Industrial Forestry Service Ltd., Environmental Dynamics Inc. and members of the Champagne and Asihik First Nations investigated twenty-two Areas of Interest within the Pine Lake and Canyon Landscape Units in July of 2007.

The target volume specified for this project was 250,000m³. In total, 19 of the initial 22 areas were selected for proposed harvesting, including 5 on CAFN settlement lands. The final net harvestable volume on these 19 areas is 254,197m³. Refer to Table 2 (Section 3.1 of this THP) for an area and volume summary for each block.

1.4 Eco-region and Drainages

The planning area lies within the Boreal Cordillera Eco-zone in the transition zone between the Ruby Range Eco-region and the Southern Lakes Eco-region.

The climate of this area is characterized by short, cool summers and long, cold winters. Winter temperature inversions are common, giving milder temperatures at higher elevation. Maritime air from the Gulf of Alaska periodically invades the ecoregion during the winter to produce mild spells with near-thawing temperatures. The mean annual temperature for the area is approximately -3°C with a summer mean of 10°C and a winter mean of -17°C. Lying within the rain shadow of the St. Elias Mountains, mean annual precipitation ranges 225–300 mm in the major valleys.

Northern boreal forests occupy lower slopes and valley bottoms. White Spruce is common on well-drained sites often in combination with dwarf willow, dwarf birch,

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soapberry and ericaceous shrubs. Willow, dwarf-birch and mosses are found on poorly drained sites. Trembling Aspen and Balsam Poplar occupy the warmer south aspects and are often mixed with spruce. Lodgepole Pine is very rare in the planning area. At the higher elevations (above 1,200m a.s.l.) sparsely vegetated alpine communities consist of mountain avens, dwarf willow, dwarf-birch, ericaceous shrubs, and mosses.

Characteristic wildlife includes grizzly and black bear, moose, beaver, fox, wolf, hare, raven, ptarmigan, northern goshawk and golden eagle. Bison have been introduced to the area and the herd appears to be healthy.

Land uses reflect high recreational, tourism, and hunting values in alpine and subalpine sections. Mining potential is locally high. Forestry resources are significant in lower slopes and valley bottoms. The main community in the region is Haines Junction. The population of the area is approximately 1,200.

The landforms in the project area are generally flat lying glacio-fluvial and glacio-lacustrine deposits with some morainal landforms at higher elevations. The soils are predominantly fine textured silts, silt-loams and silty-clays with few coarse fragments.

1.5 Incorporation of Traditional Knowledge and First Nations Values

This project represents a cooperative process between CAFN and Yukon governments to develop areas for timber harvesting. As such, incorporation of traditional knowledge and First Nations values is an essential component of the project. It is at this planning stage that these values and this knowledge are best addressed and applied.

CAFN initiated a directed oral history interview project with many CAFN citizens, to identify a wide range of values and knowledge of historical use of the areas of Interest/ proposed timber harvest blocks. Interviews included CAFN trappers, CAFN elders, and CAFN users of the land for this overall area. Details of these interviews and the report are currently held in security as per CAFN traditional knowledge policy. However, information and suggestions gained through these interviews were applied through the joint drafting of the project, via the CAFN Forester. Many of the site specific values identified in these interviews were similarly recognized and protected for through managing other values (such as wildlife buffers, wildlife corridors, visual buffers), and through management prescriptions and strategies (e.g., access management, season and timing of harvest), as described in Sections 2 ("*Landscape Issues*") and 3 ("*Stand level Issues*"). Some site specific First Nations values are outlined in the following sections, and/or in Appendix D, "*Site and Harvest Plans*".

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2.0 LANDSCAPE ISSUES

The SFMP and the ILP provide a number of guidelines for the development of harvesting projects. These are discussed in the following sections along with stand level actions used to address each issue on the Areas of Interest covered by this THP.

2.1 Wildlife

Many landscape-level wildlife values and habitat requirements have been identified by zoning from the Integrated Landscape Plan, and identification of landscape level connectivity corridors. These polygons are meant to provide undisturbed wildlife movement corridors, but also identify sites noted as key habitat for wildlife or riparian values.

An estimate of the proportion of forested land area occupied by all of the Areas of Interest, to the land area of the Landscape Units is approximately 6.5 % (percent of land area occupied by Areas of Interest within the Forest Resource Management Zone is approximately 3%).

Most of the FRMZ was designated as high wildlife value areas where management of wildlife values would be a priority. Since the ILP used a “*broad brush approach*” to delineating high wildlife habitat, 86% of the FRMZ was mapped as high wildlife value areas (i.e. virtually all of the forested land in the project area). Therefore, all blocks, with the exception of a portion of block 16, are proposed in areas that “*have the potential for high wildlife value*”

However, as stated in the ILP, the intent was to have “*a more detailed assessment of habitat value at the timber harvest project and site planning stages*” (CATT ILP, Feb 2007). This was partly addressed through agency referral in September – October 2007. The contractor also used existing guidelines and observations gained through the reconnaissance and cruising phases of the project to identify and exclude areas considered of high value for wildlife use (including stands with low or no beetle attack, deciduous stands, forest adjacent to large riparian features & wetlands, potential connectivity links, mixed wood stands, dens, mineral licks, raptor nest sites, etc.).

Consultation with CAFN citizens identified all forested areas being of value for wildlife. Many culturally important species such as moose and furbearers occur throughout all areas. Interviewees indicated several areas as generally very important wildlife habitat. Most of these areas were already identified as such through the connectivity assessment work or agency referral, and provided the necessary protection. Additional areas identified by CAFN citizens included all of blocks 1, 3, 6, 13, 13B, and 22, and the north end of block 14 (in the general proximity of the mounding trials (see *Appendix D and E*). Emphasis was on the importance for moose in the winter. For these added areas, a high priority should be placed on reducing unwanted ATV access into and through these blocks. See *Access Management section 4.4.*

Although some connectivity corridors are immediately adjacent to several harvest

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blocks as shown on the Overview Map in Appendix A, no harvest blocks jeopardizes the goal of the primary and secondary corridors to “*provide an un-harvested corridor through the FRMZ associated with riparian buffers and key habitats*”. The topographic features, timber type edges, habitat types, etc. used for connectivity mapping are essentially those same features used for delineation of the Areas of Interest with the refinement of site specific GPS traverse information for the latter.

Within each Area of Interest, aggregated patches (buffers and reserves) were identified to support the protection and maintenance of wildlife habitat for multiple species and ecosystem function. These reserves and buffers serve several purposes including; in-block connectivity, structural complexity, feeding habitat, coarse-woody debris, furbearer denning sites, thermal cover, escape cover, protection of known nest sites, and protection of riparian features. Reserves and buffers serving other functions, such as visual or potential heritage site buffers, may have the added benefit for wildlife management objectives.

Several species-at-risk and protected species occur in the CAFN traditional territory, but only a small number may occur in this planning area. Referral to the agencies responsible for managing species at risk and protected species did not raise any special concerns for these species. The range of wood bison extends into several of the blocks (esp. blocks 10, 11). Wood bison will likely not be adversely affected by the forest harvesting as planned.

For all Areas of Interest, the CATT ILP guidelines in section 3.5, the Timber Harvest Planning and Operating Guidelines (THPOG 1999) and the stand level connectivity recommendations were applied to ensure:

- Connectivity recommendations were applied at landscape levels. Blocks were designed to ensure adequate areas between blocks, and provisions within blocks are allowed to facilitate wildlife movement within and between blocks;
- Connectivity will likely be enhanced for some species by the removal of significant amounts of dead timber that would become a barrier to wildlife (particularly the connectivity focal species such as moose) if left to fall down;
- “*Aggregated patches*” and increased stand structural diversity will be maintained on all harvest blocks to provide wildlife habitat (e.g. for the focal species group “*old forest bird guild*” (*Connectivity recommendations*)) ;
- The proportion of retention (buffers, reserves and dispersed trees) was maintained (also see section 2.2.3 of this THP);
- Harvesting and silviculture strategies are compatible with the diversity of stand structure and habitats needed for wildlife in general;
- The Connectivity recommendations document also provides access management recommendations to achieve wildlife and connectivity objectives. These issues are addressed in section 2.1.6 of this THP.

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2.2 Biodiversity

The guidelines in CATT ILP sections 3.1, 3.2 and 3.5, along with the THPOG, were applied to the Areas of Interest to ensure overall biodiversity requirements are maintained at the stand level. Some of these management applications include; ensuring forest structural retention at all sites is met, timing of harvest generally restricted to winter, variability in size and configuration of harvest blocks, considerations for focal species, considerations for species-at-risk if present, and maintenance of coarse-woody debris and management for windfirmness-blowdown.

To maintain landscape level biodiversity over time both harvest rate and cut/leave pattern must be considered. Forest harvesting should attempt to emulate the natural disturbance regime as much as possible. In the CATT, both the spruce bark beetle and fire are the major natural disturbance agents. For this project, less than 5% (based on net operable area) of the forested area of the planning units (Pine Lake and Canyon Landscape Units) may be harvested.

The spruce bark beetle has caused a large and abrupt disturbance in the relatively homogeneous, mature forest and timber harvesting will help promote regeneration of the early seral stage forest. Harvest of the identified Areas of Interest will remove a proportion of the overstorey, while maintenance of the advanced regeneration and portions of the live overstorey (e.g. application of variable retention: aggregated and dispersed retention) will closely emulate the natural disturbance regime at the stand level. The size and total area of the proposed harvest blocks are well within the range of the spatial and temporal scale of the natural disturbance regime.

2.3 Riparian and Water Resources

In order to protect riparian and water resources in the region, the Integrated Landscape Plan guidelines were followed. One of the key guidelines is to ensure no more than 20% of the forested landbase is disturbed within a watershed for the duration of time it takes for the vegetation to recover. Since "*Landscape Units... are established using watershed boundaries in most cases*" (CATT ILP, Feb 2007) and the Net Operable Area is only 5% of the combined Pine Lake and Canyon LU's, the area impacted by cumulative harvesting disturbance does not exceed "*more than 20% of the watershed*" (CATT ILP, Feb 2007, section 3.6). It should also be noted since harvesting targets the dead trees (which do not take up water); the evapo-transpiration balance will be affected minimally by harvest.

At the stand level, the CATT ILP guidelines in section 3.6, the Timber Harvest Planning and Operating Guidelines (THPOG) were applied to the Areas of Interest to ensure:

- All streams in and adjacent to the harvest areas are classified and defaulted to fish bearing.
- Reserve zones, appropriate to the size of the riparian feature, are established between the harvest area and the riparian feature.
- 100% retention was prescribed for the management zone on all riparian

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features within or near the harvest area with the exception of three small wetlands where partial retention is prescribed).

- No crossings of classified riparian features are required on proposed or existing access roads used for harvesting. In addition, most roads are proposed to be temporary access requiring rehabilitation within two years of harvest (i.e. minimize soil disturbance).
- With the exception of a portion of Areas 13 and 13B (Where a research trial on summer harvesting is prescribed), all harvesting will occur during the winter to minimize the potential for site degradation.

2.4 Recreation and Visual Values

As per section 3.7 of the CATT ILP, the primary issues in this regard are visual concerns adjacent to the Alaska Highway and maintaining existing access to frequently used recreational sites.

For all blocks, visual buffers, irregular block shapes, and on-block retention have been planned with the objective to alleviate visual concerns. It is likely that re-establishment of a healthy young forest will be more aesthetically pleasing to most tourists and recreational viewers than the current beetle killed stands.

Maintenance of existing trails and roads in their pre-harvest condition will address recreation concerns.

2.5 Heritage and Cultural Values

Known heritage sites were identified during the post-reconnaissance field work through agency referral with the Department of Tourism and Culture - Heritage Branch staff. None of these areas is within the proximity of proposed harvest blocks.

There is also potential for sites that are not yet known to occur in these areas. This timber harvest project uses a parallel process of using both First Nations and non-First Nations expertise to identify areas that have high heritage site potential.

The first approach involved the application of a heritage site predictive modeling tool for non-settlement lands, which uses terrain, water, and other landscape features (e.g., neo-glacial Lake Alsek lakeshores) which are commonly associated with known sites to suggest these similar landscape features may be indicative of historic use. This predictive modeling approach identified some sites in and around the areas of interest with high potential. In areas identified with high potential for heritage resources, and where a level 2 type impact is anticipated, a surface and sub-surface inventory and assessment was recommended. Where a level 1 type impact is anticipated, a surface inventory is recommended (Heritage Resources Overview Assessment Report, YG – 2007). Some of these areas were immediately buffered (removed from net harvest area).

Champagne and Aishihik First Nations has developed an independent approach for

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identifying first nation heritage values. The first phase included traditional knowledge-based interviews with Elders and other CAFN users of the land (as described in Section 1.5). The knowledge learned in this process will direct CAFN based preliminary field reconnaissance surveys for heritage sites (as per ILP guideline: *“a pre-harvest field assessment of cultural and heritage values (should be done) in snow and frost free conditions by qualified personnel on behalf of the Champagne and Aishihik First Nations.* Some of the preliminary field work has been completed and has been incorporated into this project. Further field work will be completed by Fall of 2008 assessing all sites with high potential according to CAFN interpretation. Some of the known areas are generally identified and provided protection through existing wildlife buffers or visual buffers. Blocks with known potential requiring these further assessments in the Fall of 2008 include blocks: 7, 9, 11, 12, 15, 16, 17, 19, 21 and 22. Information from these assessments will be fed into individual permit applications with suggested mitigations.

During the timber cruising and block layout field work phases, forest professionals and CAFN assistants recorded no accidental discoveries of heritage resources within the Areas of Interest, with the exception of a trail in Area 11 and some sites in Area 22 that were subsequently excluded from harvest.

Each Site and Harvest Plan has instructions to stop work should a resource feature be found during the harvesting stage.

2.6 Hunting and Trapping

The guidelines in section 3.9 of the CATT ILP will be used to ensure this THP is compatible with these uses.

CAFN has led direct stakeholder consultation with many of its citizens (as described in Section 1.5), including those holding traplines in the area to develop site specific information on hunting and trapping values for the areas of interest, and screen for various concerns. The timber project planning region overlaps with 6 individual trapping concession areas (5 held by CAFN citizens interviewed) and one community trapline area (Haines Junction). Furbearers such as fox, coyote, lynx and wolverine are the main uses in the forested areas in this region. Some blocks have existing CAFN citizen trapline trails, which will be mapped by Fall 2008 (as per heritage assessment work). All trapline concession holders will be notified prior to harvest activity to ensure sets are identified and activities are coordinated between the trapper and the harvest operator.

All harvest blocks are valued as hunting areas) for a variety of species such as moose, small game, gamebirds and furbearers. Old trails and roads (like the old Alaska Highway, Marshall creek road, and other “wagon” trails and “foot” trails, are of interest for hunting, especially the teaching to younger generations small game hunting skills. The Site and Harvest Plans (Appendix D) identify areas where buffers should be provided between these roadways and the interior of the block, including blocks: 16, 17, 18, 21 and 22.

Most citizens interviewed expressed concern for access management. These are

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addressed in section 4.4.

Timber harvest is likely to have a minor impact on changes to wildlife habitat at this scale. There will likely be many positive responses to a wide range of species through the creation of early stage forest from harvesting. Logged areas will likely create attractive foraging areas for moose and other species, meanwhile added disturbance could have an (temporary) impact of resident animals.

Harvesting of dead trees in the overstorey could assist in reducing the probability of wind-throw in these stands, which would assist in the access for local activities such as berry picking, mushroom picking and plant gathering, etc.)

2.7 Research and Monitoring and Adaptive Management

The Strategic Forest Management plan (SFMP) explicitly incorporates a commitment to adaptive management. Adaptive management involves monitoring the effects of forest management activities and modifying practices as necessary to ensure that objectives are being met. Adaptive management also requires clear methodologies and consistent procedures that can be replicated over time to provide comparison of results and changes.

An important part of adaptive management is the development, tracking and reporting of local level indicators. They are a key tool in measuring the effectiveness of forest management strategies in the region in achieving management objectives and therefore to adaptive management. An indicators report was prepared for this THP. This report, entitled *Local Level Indicators of Sustainable Forest Management in the Champagne and Aishihik Traditional Territory: An Assessment of the 250,000m³ Pine/Canyon Timber Harvest Project*, may be found in Appendix D. The report provides the results of an analysis of the influence of the Pine/Canyon THP on a select list of indicators of sustainable forest management as defined by the SFMP. In addition, this report provides an assessment of the THP with respect to thresholds defined by the ILP. This assessment provides an indication of how well the THP meets the goals and objectives of the SFMP and further guidance provided by the ILP on a number of resource management thresholds or levels that an indicator should not exceed.

This THP also includes three “active” adaptive management experiments or operational trials. Active adaptive management involves establishing experiments that allow the outcomes of alternative management actions to be monitored and compared. The benefit of these trials will be to gain both short term and long term data on harvesting and reforestation of beetle killed stands. These trials will also help to inform the development of best management practices at the operational scale and will help to inform future THPs. These operational trials are listed below and detailed study designs are included in Appendix C.

- Site Preparation (Areas 17, 17 & 18) - The purpose of this study is to examine the effect of various mechanical site preparation treatments on the growth and survival of conifer seedlings in harvest areas. Two mechanical site preparation techniques will be studied -- mounding and disc trenching.
- Summer/Winter Harvest (Areas 13 and 13B) - The purpose of this study is to establish an active adaptive management experiment to compare levels of soil disturbance and natural regeneration, particularly the growth and survival of conifer seedlings, on summer and winter harvested areas.

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- Understory Retention (Areas 17, 17 and 18) - The purpose of this study is to establish an active adaptive management experiment to assess alternative understory retention strategies on post-harvest mortality rates, the economics of forest harvesting, wildlife use of these areas and potential forest fire behaviour.

Adaptive management implies that all plans may be subject to changes as new information arises. As such, this plan should be considered the main guiding document for timber harvest planning from the publication date of approval. New information brought forward that may improve aspects of this plan should be considered as it is brought forward.

3.0 STAND LEVEL ISSUES

While the individual block reports provide the details of this harvest opportunity, the following comments highlight some interesting site-specific observations that affect the stand management and silviculture strategies applied to the Areas of Interest:

- Given the easy access, flat terrain and uniformity of site conditions, virtually any of the proposed Areas of Interest would provide suitable opportunities for silviculture research or operational trials with regard to, retention of understorey, artificial regeneration, site preparation (mixing or mounding treatments), alternate species selection, of regenerated stands.
- Given the extent of the infestation, it is important to identify and collect viable seed from the region, which can be stored for future regeneration before all trees of cone bearing age are dead.

3.1 Ecosystem and Stand Composition

The Areas of Interest in this THP are all located in the Simple Upland Natural Disturbance Type (NDZ 3) and consist of relatively uniform stands of pure White Spruce or White Spruce with a minor Trembling Aspen component. The stands were all classified as Open Canopy White Spruce Types (V17 Types) using the *Ecosystem Classification for the Southern Yukon Field Guide* (1986).

The Areas of Interest are characterized by uniform conditions with regard to all aspects of their ecology including stand types, species composition, stand structure, understorey plants, humus forms, soils, landforms, etc. Uniform conditions will lend themselves to predictable management responses over broad areas when harvesting and silviculture are applied.

The individual Site and Harvest Plans (Appendix D, under separate cover) provide site-specific ecological and stand composition information.

3.2 Silviculture Systems and Harvest Methods

Apart from the uniform ecosystem and stand conditions (described above), the single most influential factor with regard to silviculture systems and harvest methods is the high incidence of spruce bark beetle affected trees. The most important component of these stands is the existing regeneration, saplings and poles

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(<12.5cm DBH) that have not yet been infested with beetles and are at low risk because of their small diameters and thin bark.

The intensity of the beetle infestation has limited harvest method to a “*Salvage Harvest*”, as described in the SFMP. The harvest objective will be to direct operators to remove most of the merchantable beetle attacked trees (except in those areas designated as in-block reserves and buffers) while protecting the un-attacked trees to the greatest extent possible. The leave tree specifications in the Site and Harvest Plans specify all existing un-attacked trees as the target for retention (including all deciduous) with a minimum understorey retention of at least 50% of the pre-harvest un-attacked trees per hectare (except for the research trial areas that have various specific objectives). This provides an achievable standard of retention suitable to a variety of harvesting equipment and operators.

By strict definition, however, this silviculture system is classified as either a “clearcut with reserves” or a “*natural shelterwood*” (Silviculture Systems Guidebook, BC MOE, 1995). Both systems remove the target overstory trees in one cut and reproduce an even age forest through natural or artificial means (they only differ in the degree to which existing natural regeneration contributes to post harvest stocking).

Other silviculture and harvest constraints generally common to all areas are as follows:

With regard to harvesting opportunities, time is of the essence because wood quality will decline exponentially and the fire hazard will increase as a greater proportion of the stands die and fall over.

As a silviculture tool, broadcast burning is not warranted because of the relatively thin humus layers and the high potential for escape. This does not preclude the burning of landing piles or piled excess slash to reduce fire hazard potential after harvest.

Natural Regeneration should be supplemented with fill planting where post harvest stocking surveys indicate the need.

The Individual Site and Harvest Plans (S&HP), provide specifics on leave tree specifications, soil conservation, etc., for each Area of Interest in Appendix D (under separate cover).

Sites in close proximity to the communities where fuel abatement is the over-riding objective, an attempt to convert the stand to deciduous dominated should be applied.

3.3 Retention

As per the CATT ILP guideline 3.1.2 “*Retention strategies for blocks inside high wildlife areas will be targeted at an average of 25% of the stem count or volume, as deemed most appropriate. The retention strategy should specify the type, amount and spatial configuration of the structure to be retained. The retention can be groups of mature trees or in single trees*” furthermore, CATT ILP guideline 3.5.3 states:

CATT TIMBER HARVEST PROJECT FOR THE PINE LAKE AND CANYON LANDSCAPE UNITS

“High wildlife areas should average 25% retention of stand structure. The range of retention can be 10-30% stand structure depending on the site characteristics. The retention objective can be met with individual trees or patches of trees.”

To satisfy these requirements, the following stand level strategies have been implemented:

Due to the diversity of tree sizes being retained, it was deemed most appropriate to target retention as a percent of volume retained.

Retention is in the form of patches or groups that are labeled as Buffers when they provide connectivity to the outside of the block (i.e. peninsular) and Reserves when they do not provide connectivity (i.e. insular). Most patches are generally representative of the current stands and include live and dead mature spruce, mature aspen and un-attacked understory regeneration in varying amounts.

The proportion of the area retained can be considered equivalent to the proportion of volume retained (i.e. buffers and reserves have approximately the same volume per hectare as the harvest area).

Retention is also in the form of dispersed retention (predominantly un-attacked spruce under 12.5 cm in diameter and mature deciduous trees). Retention of live spruce greater than 12.5 cm may also be managed for in some blocks. The dispersed retention will be scattered across the harvest area. A conservative estimate of its “area equivalency” adjusted for the amount of volume these dispersed trees represent out of the original stand” is provided on Table 2 in section 3.1

Total Retention (by volume) for all Areas of Interest ranges from 13 to 49% with an average of 34% (as presented on Table 2 in section 3.1 of this THP). This is slightly higher than the stated CATT ILP target for retention.

Table 1 on the following pages provides a detailed list of the specific attributes and functions of all buffers and reserves in each Area of Interest. Buffers are designated for their primary function (i.e. Wildlife, Visual, Riparian, Other). Reserves have a broad range of functions, so they are simply designated as reserve. The table clearly shows that all buffers and reserves (retention patches) serve a wide range of functions.

CATT TIMBER HARVEST PROJECT FOR THE PINE LAKE AND CANYON LANDSCAPE UNITS

TIMBER HARVEST PROJECT RESERVE & BUFFER FUNCTIONS AND ATTRIBUTES FOR ALL AREAS OF INTEREST (TABLE 1)

AREA	RESERVE OR BUFFERS	RESERVE / BUFFER ATTRIBUTES					RESERVE / BUFFER FUNCTIONS																		
NUMBER	DESIGNATION	SPECIES	AGE CATEGORY	HEIGHT RANGE	STAND STRUCTURE	SMALL INCLUDED TYPES (brush, immature, NP, etc.)	Stand Structural Diversity	Species Diversity	General Biodiversity	Open Forest-Grassland, or Brush Complex	Unique or Rare Ecosystems / Species	Large Mammal Feeding Habitat	Coarse Woody Debris / Furbearer Habitat	Thermal &/or Escape Cover	Connectivity / Travel Routes	Known Nesting / Denning	Visual Screening	Non-Target Species or Stands	Representative Leave Patch	Inoperable (steep, rocky, wet or unstable terrain)	Riparian Feature / NCW / NCD's	Known Resource Feature (cabin, lick, etc.)	Recreational Feature or Use	Other (Research Control)	Cultural Feature or Use
1	RESERVE	At, Sw	mature	15-25m	uniform	no	X	X	X				X	X			X		X						
1	WILDLIFE	At, Sw	mature	15-25m	uniform	no	X	X	X			X		X		X	X		X						
1	VISUAL	Sw	mature	15-25m	uniform	no	X		X				X	X			X		X				X		
1	OTHER	At, Sw	mature	15-25m	uniform	no	X	X	X			X					X		X						
3	OTHER	Sw	mature	10-20m	dense-uniform	no	X		X				X	X			X		X		X				
6	WILDLIFE	At, Sw	mature	8-20m	open-multi-layer	no	X	X	X			X				X	X		X						
6	VISUAL	Sw	mature	10-20m	uniform	no	X		X				X	X			X		X				X		
6	OTHER	At, Sw	mature	8-20m	open-multi-layer	no	X	X	X			X					X	X							
7	OTHER	Sw(At)	mature	8-16m	open-multi-layer	yes	X	X	X	X			X	X							X				
7	WILDLIFE	Sw(At)	mature	8-16m	open-multi-layer	no	X	X	X					X			X		X						
9	OTHER	Sw	mature	15-20m	open-multi-layer	no	X		X	X		X		X			X		X						
9	RESERVE	Sw	mature	15-20m	open-multi-layer	no	X	X	X	X		X		X			X		X						
9	WILDLIFE	Sw	mature	15-20m	open-multi-layer	no	X		X					X			X		X						
10	WILDLIFE	Sw(At)	mature	10-17m	open-multi-layer	no	X	X	X	X		X		X	X	X	X								
10	VISUAL	Sw	mature	10-17m	uniform	no	X		X				X	X			X		X						
11	VISUAL	Sw	mature	15-24m	uniform	no	X		X				X	X			X		X						
11	OTHER	Sw	mature	15-24m	uniform	yes	X		X	X					X		X		X	X					X
12	VISUAL	Sw(At)	mature	10-20m	open-multi-layer	yes	X	X	X	X		X				X	X		X				X		
12	OTHER	At, Sw	mature	10-20m	uniform	no	X	X	X			X					X	X							
12	RESERVE	Sw(At)	mature	10-20m	uniform	no	X	X	X				X	X			X		X						
13	RIPARIAN	Sw	mature	17-25m	uniform	no	X		X			X		X					X	X	X				
13B	WILDLIFE	Sw	mature	13-26m	uniform	yes	X		X			X	X	X	X	X	X		X		X				
13B	OTHER	Sw	mature	13-26m	open-multi-layer	yes	X		X			X	X	X	X		X		X		X				
13B	RESERVE	Sw	mature	13-26m	open-multi-layer	yes	X		X			X									X				
14	WILDLIFE	Sw	mature	10-25m	uniform	no	X		X				X	X		X	X		X						
14	RIPARIAN	Sw	mature	10-25m	uniform	no	X		X				X	X			X		X	X	X				
14	VISUAL	Sw	mature	10-25m	uniform	no	X		X				X	X			X		X						
14	RESERVE	Sw(At)	mature	10-25m	uniform	no	X	X	X				X	X			X		X	X					
15	WILDLIFE	Sw	mature	15-22m	uniform	yes	X		X				X	X			X		X						
15	VISUAL	Sw	mature	15-22m	uniform	no	X		X				X	X			X		X						
15	OTHER	Sw	intermediate	5-15m	uniform	yes	X		X				X	X	X	X	X	X			X				
16	RIPARIAN	Sw	mature	16-22m	uniform	no	X		X			X	X	X			X		X	X	X				
16	OTHER	Sw	mature	16-22m	uniform	no	X		X			X	X	X			X		X	X					
16	RESERVE	Sw	mature	16-22m	uniform	no	X		X					X			X		X					X	
17	WILDLIFE	Sw	mature	12-25m	uniform	no	X		X					X		X			X						
17	OTHER	Sw	mature	12-25m	uniform	no	X		X					X	X		X		X	X	X				
17	RESERVE	Sw	mature	12-25m	uniform	no	X		X					X			X		X					X	
18	WILDLIFE	Sw	mature	15-28m	uniform	yes	X		X			X	X	X		X	X		X			X			
18	RIPARIAN	Sw(At)	mature	15-28m	uniform	yes	X	X	X			X	X	X	X		X		X		X	X			
18	VISUAL	Sw	mature	15-28m	uniform	no	X		X				X	X			X		X						
18	OTHER	At, Sw	mature	15-28m	open-multi-layer	no	X	X	X									X		X					
18	RESERVE	Sw	mature	15-28m	open-multi-layer	yes	X		X			X								X	X			X	

TIMBER HARVEST PROJECT RESERVE & BUFFER FUNCTIONS AND ATTRIBUTES FOR ALL AREAS OF INTEREST (TABLE 1 Cont')

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CATT TIMBER HARVEST PROJECT FOR THE PINE LAKE AND CANYON LANDSCAPE UNITS

3.4 Reforestation

As described in section 2.2.1 reforestation on all harvest areas will be predominantly natural regeneration through retention of all un-attacked trees. This will be supplemented with artificial regeneration (fill planting) where post harvest stocking surveys indicate a need. Any areas that are NSR (Not Satisfactorily Restocked) due to natural gaps in the original stand, harvest damage, pest damage or other cause must be treated within the Assessment Dates provided in the Site and Harvest Plan (S&HP) for each Area of Interest. Areas where fuel abatement is the over-riding objective and where deciduous regeneration is possible, managing for aspen and-or willow should be considered as the regeneration objective.

The Individual S&HP's (Appendix D, under separate cover) provide specifics on reforestation for each Area of Interest.

4.0 HARVESTING SECTION

4.1 Block Area and Volume Summaries (Table 2).

The following table provides an area and volume summary for all Areas of Interest covered by this Timber Harvest Project.

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CATT ILP TIMBER HARVEST PROJECT AREA / VOLUME SUMMARY FOR THE PINE LAKE AND CANYON LANDSCAPE UNITS (TABLE 2)

AREA IDENT.	AREA OF INTEREST (AOI) (ha.)	BUFFERS				GROSS OPERABLE AREA (ha.)	INTERNAL EXCLUSIONS		NET OPERABLE AREA (ha.)	LEAVE TREES DISPERSED RETENTION (ha.) Notes 1,2&3	PERCENT OF AOI VOLUME RETAINED Note 4	AVG NET CONIFER VOLUME PER HA.	EST. AVAILABLE VOLUME (M3)	BEETLE ATTACK		NOTES
		WILDLIFE BUFFERS (ha.)	RIPARIAN BUFFERS (ha.)	VISUAL BUFFERS (ha.)	OTHER BUFFERS (ha.)		RESERVES (ha.)	NON-TIMBER (ha.)						TOTAL TREES (%)	DEAD TREES (%)	
1	143.3	26.3		14.2	9.8	93.0	5.0	1.1	86.9	0.9	39%	129	11,167	64%	76%	CAFN
3	53.8				11.2	42.6			42.6	0.0	21%	124	5,283	84%	94%	CAFN
6	179.8	25.4		18.2	44.5	91.7		5.1	86.6	0.1	49%	103	8,887	66%	71%	CAFN
7	50.8	8.8			10.7	31.3			31.3	3.0	44%	76	2,371	19%	100%	
9	68.0	11.3			6.0	50.7	1.9		48.8	1.1	30%	107	5,241	46%	52%	
10	73.0	16.2		5.1		51.7			51.7	0.2	29%	74	3,842	40%	55%	
11	54.8			2.3	4.9	47.6			47.6	4.8	22%	116	5,509	56%	53%	
12	236.2			35.2	34.3	166.7	14.2	5.2	147.3	0.5	36%	94	13,868	48%	55%	
13	28.6		3.8			24.8			24.8	0.1	13%	110	2,734	70%	100%	
13B	60.7	11.4			9.8	39.5	0.3		39.2	1.0	37%	140	5,503	99%	100%	
14	210.5	31.9	1.7	11.2		165.7	21.7	5.0	139.0	0.4	32%	143	19,813	91%	96%	
15	148.8	24.9		6.5	18.6	98.8			98.8	1.8	35%	146	14,376	77%	88%	
16	298.9		17.5		37.0	244.4	19.0		225.4	0.2	25%	177	40,070	81%	90%	
17	240.8	9.2			24.5	207.1	13.0		194.1	0.2	19%	182	35,405	84%	82%	
18	277.0	22.4	75.8	16.0	3.0	159.8	13.0		146.8	1.1	47%	168	24,636	89%	85%	
19	121.4	16.7	13.1	9.5	14.0	68.1	3.7	2.4	62.0	0.4	47%	174	10,816	83%	94%	
21	256.1	10.7		29.9	27.5	188.0	11.5		176.5	2.0	32%	76	13,423	64%	88%	CAFN
22	362.0		4.0	2.3	84.2	271.5	14.4	1.4	255.7	1.7	29%	99	25,385	82%	90%	
26	89.7	10.7			22.8	56.2	2.1		54.1	6.0	46%	106	5,739	75%	100%	CAFN
TOTALS	2954.2	225.9	115.9	150.4	362.8	2099.2	119.8	20.2	1959.2	25.5	34%	130	254,197	69%	83%	
YG	2231.5	152.8	115.9	88.1	247.0	1627.7	101.2	14.0	1512.5	16.5	32%	129	209,698	69%	81%	YG
CAFN	722.7	73.1	0.0	62.3	115.8	471.5	18.6	6.2	446.7	9.0	39%	107	44,499	70%	86%	CAFN

 Shaded cells indicate calculated values These volumes entered from the cruise compilation

Note: Total volume of all AOI's does not match the sum of individual block totals due to rounding issues in the compilation process (254, 068 m3 vs 254,197 m3)

- Dispersed retention consists of understory (regeneration, saplings, poles) and all aspen that will be left after harvest.
- Dispersed retention is the proportion of the current unattacked spruce understory and mature deciduous that is reasonably expected to survive post harvest (≥ 50% based on minimum retention specs).
- Reserve Area / Volume Equivalent =
$$\frac{\text{Basal area / ha to be retained}}{\text{Total basal area / ha}} \times \text{Net Operable Area} \times \frac{\text{Understory vol / ha.}}{\text{Average vol / ha}}$$

This equation adjusts leave tree area to be the equivalent of an unharvested reserve or buffer (i.e. so that the total retention can be expressed as a % of volume retained).

- Total Volume Retained = Buffers + Reserves + Dispersed Leave Trees expressed as a percent of the Area Of Interest (AOI) volume.

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4.2 Cruise Compilation Summaries

A timber cruise compilation (BC MOF) localized using the Alsek area factors provides an estimate of the net harvestable volume, damage statistics, etc. for the merchantable portion of each stand.

A merchantable tree for this cruise was any spruce tree ≥ 12.5 cm diameter at breast height (dbh). The merchantable portion of each tree is the entire stem from a 30cm high stump to a 10cm diameter top. In addition, to get net volume, deductions are made for decay, breakage, dead trees, degraded wood, etc. so that the stated net volumes are representative of what the operator will actually harvest from the stand.

In tallying the beetle-attacked trees, there are three categories: Green Alive (cruise code 5), Green Dead (cruise code 6) and Grey Dead (cruise code 7). The difference between Green Alive and Green Dead is noted as intensity of attack. In both cases, the tree still has foliage, but Green Alive indicates the tree has been attacked with some pitch tubes but may survive. In Green Dead, the tree has been subjected to mass attack, with at least 2 or more pitch tubes at the same level within 180° of the circumference and is for all intents and purposes dead (i.e. fatally wounded).

With regard to the Beetle Attack figures in Table 2 the 'Percent Total' shows the percentage of Green Alive, Green Dead and Grey Dead (codes 5, 6 & 7). which are all trees in the stand that have been attacked by beetle. The 'Percent Dead' shows only Green Dead and Grey Dead (codes 6 & 7) which are all the trees in the stand that are dead or "fatally wounded". The percentages are by stem count or number of trees. However, because the spruce beetle attacks the larger diameter trees in a stand first, the percent of volume attacked and dead will be higher than the values shown in most harvest blocks.

While the individual compilations (Appendix E, under separate cover) provide the details for each harvest block, some planning area averages are as follows:

- Total Net Merchantable Volume of spruce from all harvest blocks is 254,197m³.
- Average tree diameter is 20.3cm, average height is 15.5m average age is 121 years and average species composition is Spruce 98%, Aspen 2%.
- The average number of spruce trees per hectare (>12.5cm dbh) is 838 of which 69% are attacked by beetles. Of those attacked trees 83% are dead.
- 82% of the net merchantable volume is from beetle attacked trees (i.e. 69% of the stems equates to 82% of the volume).

4.3 Harvest Scheduling and Season

The harvest blocks are prioritized for harvest based on incidence of beetle attack and timber utility in the individual Site and Harvest Plans (Appendix D, under

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separate cover). Most areas are rated high. For this planning area however, the CATT ILP, Feb 2007, section 2.7.1 states: "*Strategic consideration to the size, shape and location of any developments that would enhance fuel discontinuity should be a primary management focus in this zone. Silvicultural principles can be implemented to reduce fire hazard.*"

To achieve this objective, "*clustered harvest*" will produce an effective fire break (i.e. by concurrent harvest of several AOI's to create a large break roughly perpendicular to the prevailing winds). These breaks should focus on AOI's with the highest incidence of beetle attack (highest fuel levels) in combination with the size, shape and location of each AOI with regard to proximity to communities and the highway (highest potential for human caused fire). The deterioration of the stand (how long will it stay standing) must also be considered because as the stand falls down the ground fuel load increases dramatically.

Given that the harvest blocks have variable piece sizes and log qualities suitable for products from house logs, to saw logs to firewood, each harvest block will be appropriately directed towards applicants based on their log profile needs. In addition, each harvest block will not necessarily be given out as a single permit. In fact, demand for fire-wood or mixed products may see some areas divided into multiple permits apportioned according to operator experience, capacity and product need.

If a harvest block is divided up, the Forest Management Branch, or CAFN for settlement lands, will coordinate all operators to ensure:

The Site and Harvest Plan (S&HP) for the area (roads & landings, rehabilitation, etc.) is followed by all operators.

The *Leave Tree Retention Specifications in the S&HP* are maintained to ensure orderly and prompt reforestation of the whole Area of Interest.

Harvesting is timely, complete and coordinated (i.e. Operators cannot be left to take only what they want, when they want it or leave a mess after they finish).

Slash disposal is completed promptly by all permit holders.

Likewise, all dead trees (>12.5cm DBH) should be harvested from all areas even if it is to be sold to firewood cutters, delivered free to the community or burnt in landing piles. Leaving any scattered dead trees on the harvest area will create danger trees for workers, not reduce the fire hazard, and be a source of potential wind throw. If a dead tree must be left standing, it should be "stubbed" (cut off at 3m) to reduce these impacts; otherwise retention of dead standing trees should be maintained within internal block reserves.

Harvest season is generally dictated by soil constraints. All harvest blocks are recommended for winter harvest due to fine textured lacustrine soils and/or moisture constraints (except harvest blocks 13 and 13B for research trial purposes).

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4.4 Access Management

In general, wherever possible, use of existing roads is proposed to minimize the need for new development. These roads can be temporarily upgraded as necessary for harvesting operations. In some cases, trails exist within some of the identified blocks. These trails may provide a corridor suitable for accessing those blocks where such use does not conflict with other potential users of those trails. Community feedback related to logging roads has stressed the importance of:

- Using existing access as much as possible,
- Appropriate timing of road construction to shorten the lifespan of the access,
- Building road to a standard appropriate for the use (ie- if heavy logging equipment will not be used, do not overbuild the road), and
- Stressing the importance of land use management considerations (ie- management considerations for potential spot land applications that may be submitted where new road access has been developed).

This last point has implications on government policy beyond the Forest Management Branch within the Government of Yukon. Discussions have been initiated to respond to this issue.

FMB in cooperation with Highways and Public Works has initiated a road gate program on single-use resource roads to control vehicular traffic from using the road during the wrong time of the year (i.e. times when they may damage the environment and/or road itself). Gates may also be used to control access into areas to minimize the impact of hunting; however, gates are not proposed for existing access or where new access from the highway does not extend more than 1/2 a kilometer off the Alaska Highway, unless deemed necessary.

All new access points from the highway will be removed upon completion of harvesting operations and reforestation obligations.

The CATT ILP and the connectivity recommendations report outline specific access management guidelines and recommendations to help reduce the impact of human development on wildlife. Site Specific strategies in this regard are as follows:

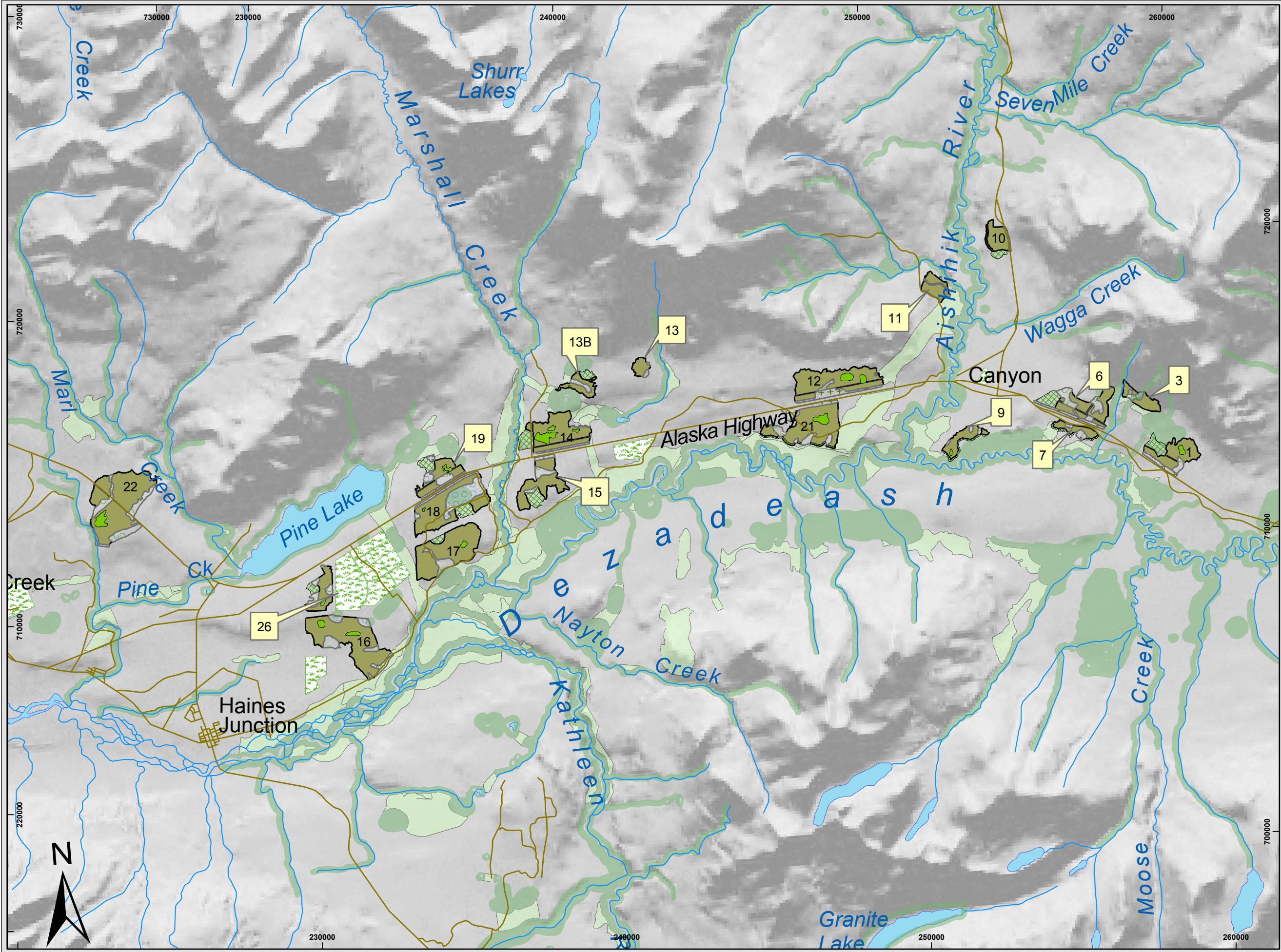
- For this THP no new access roads are to be developed across any of the primary corridors and only one new temporary road is proposed across a secondary connectivity corridor.
- No roads used for harvesting access in this THP will cross a classified riparian feature.
- Total cumulative access will not exceed the localized density of 0.40km/km² for the Canyon and Pine Lake planning units after all temporary block roads are rehabilitated.
- There are no roads proposed for dry weather travel. Blocks 13 and 13B are proposed for summer harvest trials, however, permit holders will be restricted to hauling equipment to the site during frozen soil conditions. Any wood harvested during summer months

CATT TIMBER HARVEST PROJECT FOR THE PINE LAKE AND CANYON LANDSCAPE UNITS

would then be decked for winter hauling once the soil has once again frozen.

- All existing roads used for access will be maintained at their current level pending operational assessment of permit holders' needs regarding size and type of equipment and trucks to used for hauling (most are generally Class 2 dry weather roads or lower standards).
- All proposed "in-block" roads will be temporary winter roads (Class 4 & 5) and will be rehabilitated (ripped if necessary, and scattered with debris) and reforested for access control.
- The proposed location for temporary roads and trails to develop the blocks are shown on the S&HP Maps for each Area of Interest (Appendix D, under separate cover). Minor layout adjustments and concerns will be addressed during the final layout of individual harvest areas, if needed.
- Harvesting on all areas should be completed in a short (1-2 year) time frame so temporary roads can be promptly deactivated and rehabilitated to meet access management objectives.
- Consultation with CAFN citizens indicates blocks 1, 3, and 6 is important wildlife habitat especially for moose in the winter. There is additional concern that forest harvesting and associated access development may enable hunters to access the sub-alpine to the north of these block (which has historically been an important area for Dall's sheep). As such, a high priority should be placed on reducing unwanted ATV access into and through these blocks.

APPENDIX A
1:50,000 OVERVIEW MAP



Timber Harvesting Project

Proposed as Phase of Implementation of
Strategic Forest Management Plan for
Champagne and Aishihik Traditional Territory

May, 2008

Legend

- Water Courses
- Major Roads
- Waterbodies
- Agricultural Dispositions

Proposed Logging Areas

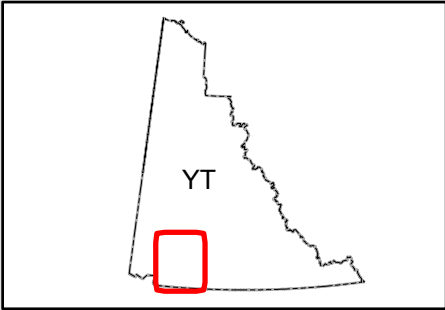
- Net Operable Area
- Block Reserves**
 - Non TBR
 - Aggregated Retention
 - Riparian Buffer
 - Visual Buffer
 - Wildlife Buffer
 - Other Buffer

Landscape Buffers

- Wildlife Connectivity Corridors
- THPOG Riparian Buffer

Forest Inventory

- Spruce Leading Forest
- Deciduous Leading Forest



Yukon Albers Equal Area Projection
North American Datum 1983

National Topographic Data Base (NTDB) compiled by Natural Resources Canada at 1:50,000. Reproduced under license from Her Majesty the Queen in Right of Canada, with permission of Natural Resources Canada.

First Nations Settlement Lands obtained from Natural Resources Canada 1:30,000 maps; recompiled by Yukon Environment against 1:250,000 NTDB.

First Nations interim protected landclaims obtained from Federal Landclaims Office, Indian and Northern Affairs Canada, 1:250,000 maps; recompiled by Forest Management Branch against 1:250,000 NTDB

APPENDIX B

SITE AND HARVEST PLANS

FOREST MANAGEMENT BRANCH

SITE AND HARVEST PLAN

1. LOCATION								
District			Geographic Location Name				Mapsheet	
Kluane			Haines Junction Area				115A	
FMU			Latitude		Longitude		SIS#	
Y06			60° 50' 11.1"		136° 55' 42.3"			
Development Area			Block Number			Air Photo Numbers		
Canyon Landscape Unit			1			N/A		
2. ECOLOGY AND SITE CONDITION								
Eco-Region			Vegetation Type			Soil Type / Soil Texture		
Ruby Range / Southern Lakes			V17			S5-S6/SiCL-C		
Elevation (m)	Slope (%)	Aspect	Terrain	Slope Position	Moist Regime	Soil Drainage	LFH Depth (cm)	NDZ
700-760	15	SW	Even	Mid	Fresh-Very Fresh	Well-Mod. Well	12	Simple Upland (3)
3. BLOCK AREA SUMMARY IN HECTARE								
Area of Interest (ha)	Wildlife Buffers (ha)	Riparian Buffers (ha)	Visual Buffers (ha)	Other Buffers (ha)	Reserve (ha)	Non Timber (ha)	Perm Roads Landings (ha)	Net Area to Reforest (ha)
143.3	26.3		14.2	9.8	5.0	1.1		86.9
4. HARVEST STAND DESCRIPTION								
Stand Number	Merch Area (ha)	Species	Crown Closure	Age (years)	Avg. Height (m)	Avg. DBH (cm)	Est. Vol/Ha (m³/ha)	
All (V17)	86.9	Sw10	15%	126	16.8	19.2	129	

SITE AND HARVEST PLAN

5. RIPARIAN MANAGEMENT					
Riparian ID#	Class (Stream Wetland Lake)	Reserve Zone Width (m)	Rationale For Reserve	Mngmt Zone Width (m)	Strategies for Management Zone
N/A	N/A	N/A	N/A	N/A	N/A
Riparian Comments : 1. Reserves and Management Zones are as per the <i>Timber Harvest Planning and Operating Guidebook</i> . 2. Riparian Features are the basis of the <i>CATT Habitat Connectivity Planning Recommendations</i> .					
6. STAND MANAGEMENT OBJECTIVES					
HIGHER LEVEL AND OTHER PLANS					
This Site and Harvest Plan is consistent with: <ul style="list-style-type: none"> • The guiding principles of the <i>Strategic Forest Management Plan for the Champagne and Aishihik Traditional Territory (CATT)</i>, • The <i>CATT Integrated Landscape Plan</i> which defines the management priorities and guidelines for Timber Harvest Project Planning. • And the <i>CATT Regional Timber Harvesting Project Within The Pine Lake and Canyon Landscape Units</i> which links the above Landscape Level Strategies, Management Priorities and Guidelines to this Stand Level Operational Plan. 					
STAND-LEVEL OBJECTIVES					
Discuss non-timber values that may be affected by the proposed treatment and measures proposed to accommodate these Traditional or First Nations					
As per the <i>CATT ILP Heritage and Cultural Guidelines</i> (section 3.8). Qualified Champagne and Aishihik personnel must conduct a pre-harvest field assessment. No potential cultural or heritage resource features were noted within the harvest area during the reconnaissance and cruising phases. If a previously unidentified cultural or heritage resource is encountered during the harvesting or road building operations, operations will cease to the extent necessary to ensure its protection until an assessment can be carried out.					
Wildlife Values					
As per the <i>CATT ILP Forest Ecosystems, Wildlife, and Biological Diversity Guidelines</i> (section 3.5) appropriate wildlife movement corridors have been maintained at the landscape level focusing on riparian management areas while stand level buffers, reserves and retention have are provided as on block elements to enhance and complement the landscape connectivity. In addition, there are no “Species at Risk” that will be adversely impacted by harvesting on this site. This block is located within the <i>CATT ILP FRMZ High Wildlife Value Area</i> . Therefore all harvest blocks must average 25% retention of stand structure with a range of 10-30%. The total amount of retention in this block (Buffers, Reserves and dispersed leave trees) is 39% by volume. As per the <i>Best Management Practices For Northern Goshawk Habitat In The Yukon Territory</i> any large stick nests found were buffered from harvest by a minimum 200m no-harvest zone connected to the outside of the harvest area. In addition, the stands in this block have a habitat suitability rank “moderate or lower due to the dead and dying mature canopy”. This block meets all connectivity requirements outlined in the <i>Habitat Connectivity Planning Recommendations For Forest harvest Planning In The Champagne And Aishihik Traditional Territory</i>					

SITE AND HARVEST PLAN

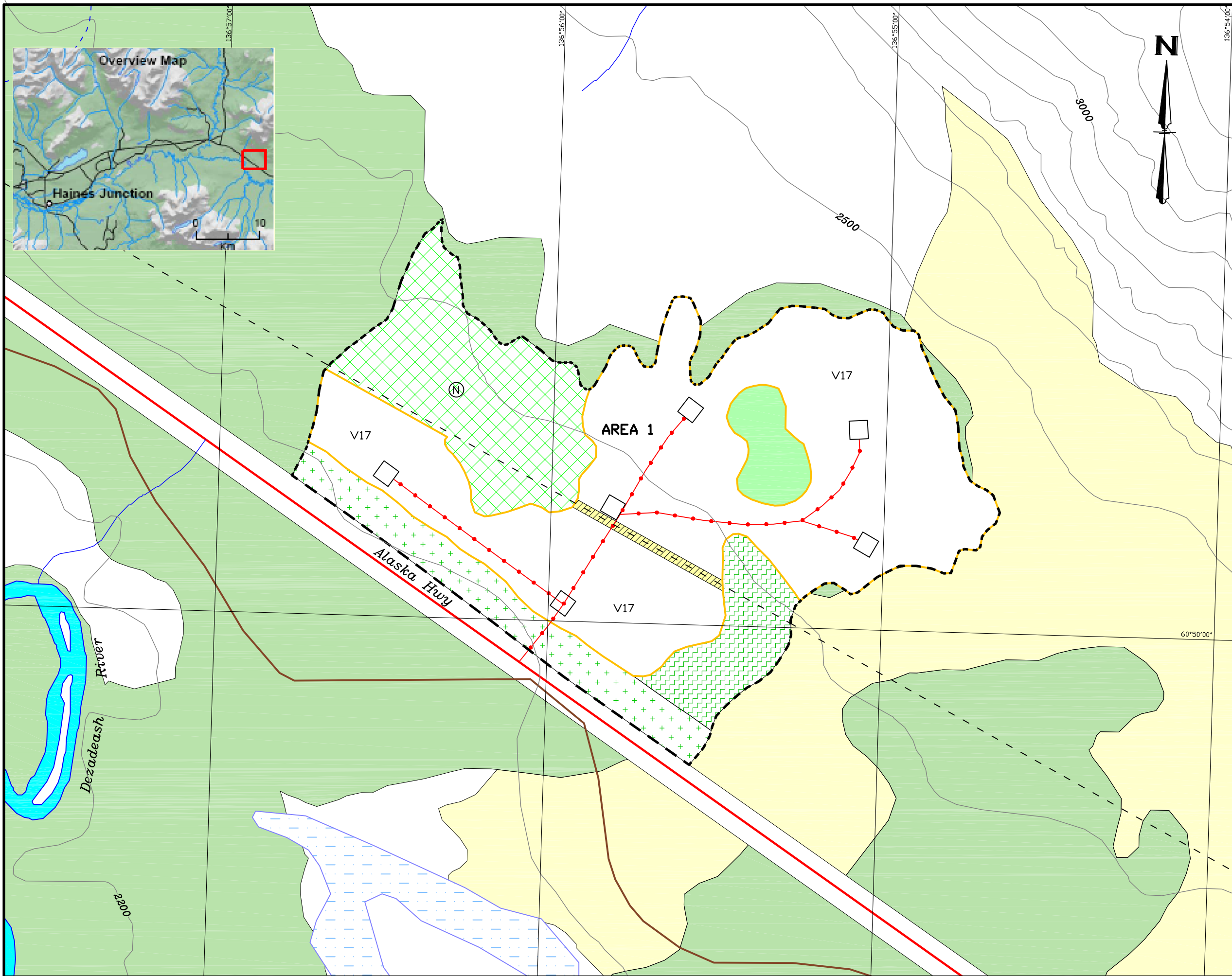
Fish Water Values			
As per the <i>CATT ILP Watershed and Riparian Management Guidelines</i> (section 3.6) the cumulative area of this and all other blocks in this landscape unit does not exceed 20% of the watershed area. In addition, the <i>THPOG</i> guidelines have been followed for all classified streams in or adjacent to this block (see section 5 <i>Riparian Management</i> of this S&HP). All streams encountered were defaulted to fish bearing.			
Recr Visual Values			
As per section 3.7 of the CATT ILP, visual concerns adjacent to the Alaska Highway have been addressed by leaving an un-harvested buffer. The minimum width for this area of interest is 60m.			
Other Values			
Fuel Abatement: This area is located in the <i>CATT ILP Forest Resource Management Zone</i> and <i>Landscape Fuel Abatement Subzone</i> . As such, it meets the management objectives of: <ol style="list-style-type: none"> 1. being a stand with >30% beetle attack. 2. having a size, shape and location that “enhances fuel discontinuity”. 3. has a stand structure that allows the implementation silviculture principles to reduce the fire hazard. 4. being close to the Alaska Highway and the communities of Haines Junction and Canyon. 			
7. SILVICULTURE SYSTEM DESCRIPTION			
STAND NUMBER	SILVICULTURE SYSTEM	SEASON	RATIONALE
V17	Natural Shelterwood	Winter	Winter harvest is required due to very high soil compaction hazard.
Dispersed Retention Leave Tree Specs			
For the V17 Type the target for dispersed retention will be to leave all Deciduous trees and all Non-beetle attacked spruce including as much of the advanced regeneration in the understory as possible. The minimum level of understory retention will be at least 50% of the pre-harvest stems per hectare.			
Special Management Zone Leave Tree Specs			
Not Applicable			

SITE AND HARVEST PLAN

8. SOIL CONSERVATION					
ON BLOCK PERMANENT DISTURBANCE CALCULATION TAB					
Disturbance Type (Road/landing)	Identification (Name / Number)	Road Standard	Length (m)	Width (m)	Total Area L x W /10,000 (ha)
N/A	N/A	N/A	N/A	N/A	N/A
Road Area	Landing Area	Total Area	Block Gross Area	Block Net Area	% Disturb. Of Gross Area
N/A	N/A	N/A	N/A	N/A	No permanent roads or landings
Depth of LFH	Hazard Ratings			Permafrost or Frost Heaving	Proposed Harvest Season
	Compaction	Surface Erosion	Displacement		
12cm	Very High	Moderate	Moderate	No permafrost	Winter
Proportion of Temporary Access Within Net Area to be reforested (explain rehabilitation measures)					
The proportion of temporary access within the NAR will not exceed 10%. These roads and landings will be ripped (as needed) have organic debris scattered on top and planted or allowed to regenerate naturally as part of the NAR. Rehabilitation will be completed within three years of harvest.					
Fire Hazard Abatement (explain measures for slash abatement)					
The current fire hazard is high to extreme. Salvage harvesting and subsequent slash reduction will greatly reduce the potential fire hazard on this site.					
After harvest, excess slash accumulated at the landings (piles) will be burned within two years of harvest. Otherwise, dispersed slash will be left to contribute to Coarse Woody Debris, small fur-bearer habitat and act as a soil carbon and nutrient supply.					
Forest Health (explain measures to reduce current and future risk of forest to disease and insects)					
This area has been severely attacked by spruce beetle (Dendroctonus Rufipennis). The proportion of merchantable stems that are attacked by beetles (Cruise Beetle Codes 5, 6 & 7) is 64%. Harvesting is prescribed to remove these trees and allow for planted and natural regeneration.					
Ips preturbatus has also been observed affecting smaller diameter spruce in this block and adjacent forest.					
Additional Comments					

SITE AND HARVEST PLAN

9. REFORESTATION AND DESCRIPTION								
SIS #	Stand #	Net Area to Reforest (ha)	Restocking		Target Stocking (SPH)	Assessment Dates Delay to Treat	Regen Surveys	
			Pref Species	Acc Species			Early Stocking	Late Performance
	V17	86.9	Sw	At	1200	H+2	H+5	H+10
Reforestation Plan								
Natural regeneration supplemented with fill planting where necessary.								
Stand Number V17 may be left for up to two (2) years after harvest to facilitate establishment of natural regeneration. A regeneration survey should be conducted at this time and any areas found to be not satisfactorily restocked will be planted no later than four (4) years after harvest. The survey will also specify other remedial actions if necessary.								
Establishment to Assessment Date Concerns								
No Brushing concerns anticipated.								
Additional Comments								
FMB								
Approval by:				Date:				
Position:				Signature:				
10. ATTACHMENTS								
Site and Harvest Plan Map @ 1: <u>10,000</u>								



INTEGRATED LANDSCAPE PLAN

TIMBER HARVEST PROJECT

CHAMPAGNE and AISHIHIK
TRADITIONAL TERRITORY
YUKON, CANADA

AREA 1

SITE AND HARVEST PLAN MAP

FMU: Y06
Eco-Region: Ruby Range / Southern Lakes
CATT ILP Zone: Forest Resource Management Zone
Sub Zone: Landscape Fuel Abatement
Latitude: 60° 50' 11.1" Longitude: 136° 55' 42.3"
NTS Map Sheet: 115 A
Base Map Information Localized

Area Summary

Area of Interest		143.3	
Landscape Buffers	Area ha	Internal Reserve and Natural NP	Area ha
Wildlife	26.3	Reserve	5.0
Riparian	0.0	Non Timber	1.1
Visual	14.2		
Other	9.8		
Gross Operable Area	93.0	Net Operable Area	86.9

Stand Number	Vegetation Type	Inventory Label	Harvest Season	Area ha
V17	V17	SW10-4A5M	W	86.9
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
Net Area to Reforest				Total 86.9

Cruise Information

Timber Type	Net Operable Area (ha)	Net Available Volume (m3/ha)
All (V17)	All (V17)	11,167

Legend

Net Operable Area

Non Forested

White Spruce

1990-1999 Fires

Balsam Poplar

Trembling Aspen

Base Map

Highway

Limited Use Road

Pro Temp Rd(Class 4/5)

Loc Temp Rd(Class 2)

Logging Road

Contour (100ft)

Trail

Cut Line

Watercourses

Wetland

Waterbody

Dry Riverbed/Sand

Scale 1 : 10,000

100 50 0 100 200 300 400 500

INDUSTRIAL FORESTRY SERVICE LTD.
1595 Fifth Avenue
Prince George, B.C.
V2L 3L9
PH: (250) 564-4115 FAX: (250) 563-9679
Date Drawn: Feb 21/07
Date of Field Work: Summer 2007
IFS Job #: 070224
Contract #: FMB 07-01

FOREST MANAGEMENT BRANCH

SITE AND HARVEST PLAN

1. LOCATION								
District			Geographic Location Name				Mapsheet	
Kluane			Haines Junction Area				115A	
FMU			Latitude		Longitude		SIS#	
Y06			60° 51' 09.0"		136° 56' 49.6"			
Development Area			Block Number			Air Photo Numbers		
Canyon Landscape Unit			3			N/A		
2. ECOLOGY AND SITE CONDITION								
Eco-Region			Vegetation Type			Soil Type / Soil Texture		
Ruby Range / Southern Lakes			V17			S5-S6/SiCL-C		
Elevation (m)	Slope (%)	Aspect	Terrain	Slope Position	Moist Regime	Soil Drainage	LFH Depth (cm)	NDZ
750-855	16	SW	Rolling	Upper	Fresh	Well	3	Simple Upland (3)
3. BLOCK AREA SUMMARY IN HECTARE								
Area of Interest (ha)	Wildlife Buffers (ha)	Riparian Buffers (ha)	Visual Buffers (ha)	Other Buffers (ha)	Reserve (ha)	Non Timber (ha)	Perm Roads Landings (ha)	Net Area to Reforest (ha)
53.8				11.2				42.6
4. HARVEST STAND DESCRIPTION								
Stand Number	Merch Area (ha)	Species	Crown Closure	Age (years)	Avg. Height (m)	Avg. DBH (cm)	Est. Vol/Ha (m³/ha)	
All (V17)	42.6	Sw10	20%	129	17.4	21.0	124	
5. RIPARIAN MANAGEMENT								
Riparian ID#	Class (Stream Wetland Lake)	Reserve Zone Width (m)	Rationale For Reserve	Mngmt Zone Width (m)	Strategies for Management Zone			
N/A	N/A	N/A	N/A	N/A	N/A			
Riparian Comments :								
1. Reserves and Management Zones are as per the <i>Timber Harvest Planning and Operating Guidebook</i> . 2. Riparian Features are the basis of the <i>CATT Habitat Connectivity Planning Recommendations</i> .								

SITE AND HARVEST PLAN

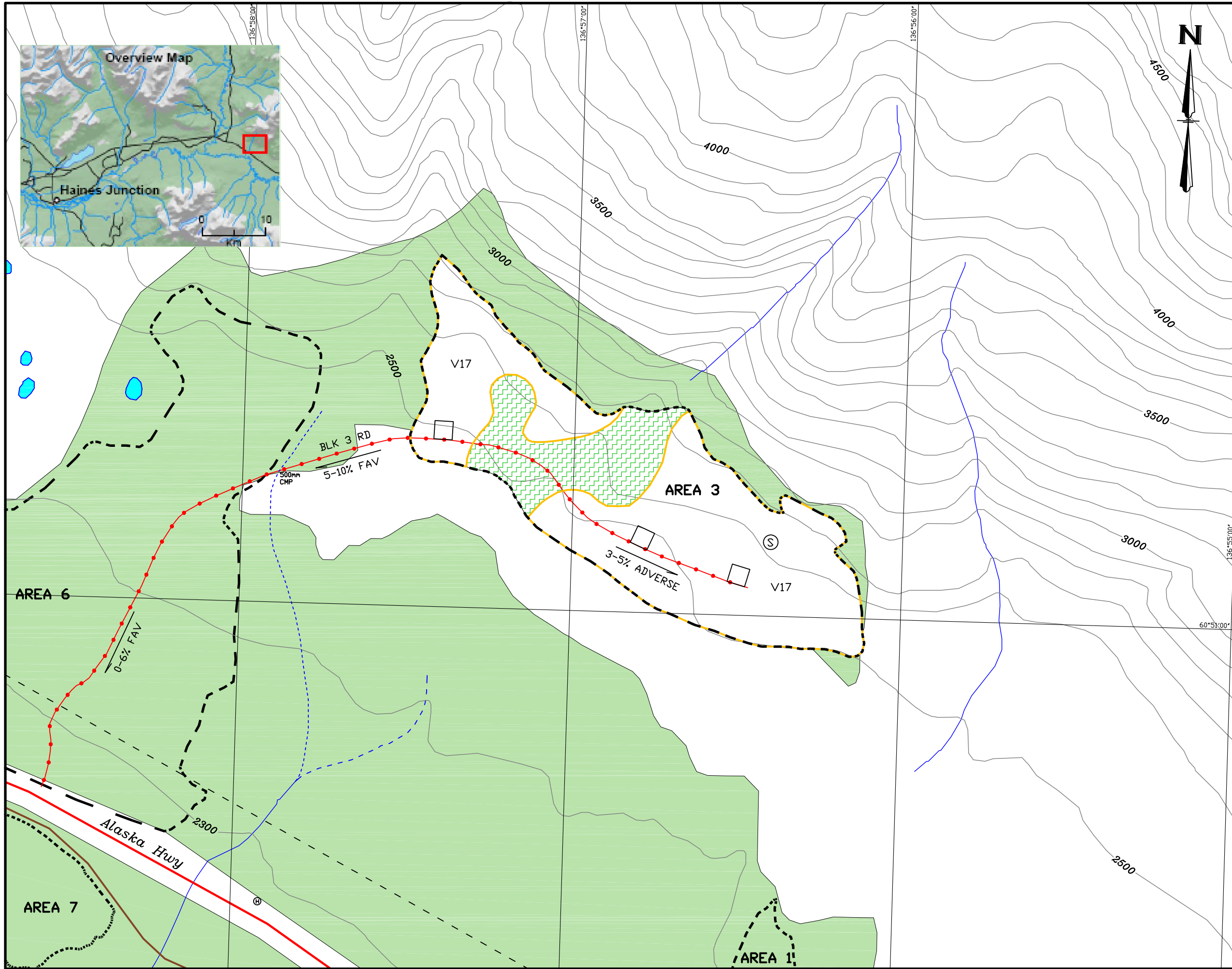
6. STAND MANAGEMENT OBJECTIVES
HIGHER LEVEL AND OTHER PLANS
<p>This Site and Harvest Plan is consistent with:</p> <ul style="list-style-type: none"> • The guiding principles of the <i>Strategic Forest Management Plan for the Champagne and Aishihik Traditional Territory (CATT)</i>, • The <i>CATT Integrated Landscape Plan</i> which defines the management priorities and guidelines for Timber Harvest Project Planning. • And the <i>CATT Regional Timber Harvesting Project Within The Pine Lake and Canyon Landscape Units</i> which links the above Landscape Level Strategies, Management Priorities and Guidelines to this Stand Level Operational Plan.
STAND-LEVEL OBJECTIVES
Discuss non-timber values that may be affected by the proposed treatment and measures proposed to accommodate these Traditional or First Nations
<p>As per the <i>CATT ILP Heritage and Cultural Guidelines</i> (section 3.8). Qualified Champagne and Aishihik personnel must conduct a pre-harvest field assessment.</p> <p>No potential cultural or heritage resource features were noted within the harvest area during the reconnaissance and cruising phases.</p> <p>If a previously unidentified cultural or heritage resource is encountered during the harvesting or road building operations, operations will cease to the extent necessary to ensure its protection until an assessment can be carried out.</p>
Wildlife Values
<p>As per the <i>CATT ILP Forest Ecosystems, Wildlife, and Biological Diversity Guidelines</i> (section 3.5) appropriate wildlife movement corridors have been maintained at the landscape level focusing on riparian management areas while stand level buffers, reserves and retention have are provided as on block elements to enhance and complement the landscape connectivity. In addition, there are no “Species at Risk” that will be adversely impacted by harvesting on this site.</p> <p>This block is located within the <i>CATT ILP FRMZ High Wildlife Value Area</i>. Therefore all harvest blocks must average 25% retention of stand structure with a range of 10-30%. The total amount of retention in this block (Buffers, Reserves and dispersed leave trees) is 21% by volume.</p> <p>This block meets all connectivity requirements outlined in the <i>Habitat Connectivity Planning Recommendations For Forest harvest Planning In The Champagne And Aishihik Traditional Territory</i>. Field verification should be done to determine the extent of closed canopy forest cover at the north edge of the block. Aerial photographs suggest less of a forested buffer between the block and the sub-alpine than illustrated in the block map (Appendix D).</p>
Fish Water Values
<p>As per the <i>CATT ILP Watershed and Riparian Management Guidelines</i> (section 3.6) the cumulative area of this and all other blocks in this landscape unit does not exceed 20% of the watershed area. In addition, the <i>THPOG</i> guidelines have been followed for all classified streams in or adjacent to this block (see section 5 <i>Riparian Management</i> of this S&HP). All streams encountered were defaulted to fish bearing.</p>
Recr Visual Values
Not Applicable

SITE AND HARVEST PLAN

Other Values					
Fuel Abatement: This area is located in the <i>CATT ILP Forest Resource Management Zone</i> and <i>Landscape Fuel Abatement Subzone</i> . As such, it meets the management objectives of: <ol style="list-style-type: none"> 1. being a stand with >30% beetle attack. 2. having a size, shape and location that “enhances fuel discontinuity”. 3. has a stand structure that allows the implementation silviculture principles to reduce the fire hazard. 4. being close to the Alaska Highway and the communities of Haines Junction and Canyon. 					
7. SILVICULTURE SYSTEM DESCRIPTION					
STAND NUMBER	SILVICULTURE SYSTEM	SEASON	RATIONALE		
V17	Natural Shelterwood	Winter	Winter harvest is required due to very high soil compaction hazard.		
Dispersed Retention Leave Tree Specs					
For the V17 Type the target for dispersed retention will be to leave all Deciduous trees and all Non-beetle attacked spruce including as much of the advanced regeneration in the understory as possible. The minimum level of understory retention will be at least 50% of the pre-harvest stems per hectare.					
Special Management Zone Leave Tree Specs					
Not Applicable					
8. SOIL CONSERVATION					
ON BLOCK PERMANENT DISTURBANCE CALCULATION TAB					
Disturbance Type (Road/landing)	Identification (Name / Number)	Road Standard	Length (m)	Width (m)	Total Area L x W /10,000 (ha)
N/A	N/A	N/A	N/A	N/A	N/A
Road Area	Landing Area	Total Area	Block Gross Area	Block Net Area	% Disturb. Of Gross Area
N/A	N/A	N/A	N/A	N/A	No permanent roads or landings
Depth of LFH	Hazard Ratings			Permafrost or Frost Heaving	Proposed Harvest Season
	Compaction	Surface Erosion	Displacement		
3cm	Very High	High	Moderate	No permafrost	Winter
Proportion of Temporary Access Within Net Area to be reforested (explain rehabilitation measures)					
The proportion of temporary access within the NAR will not exceed 10%. These roads and landings will be ripped (as needed) have organic debris scattered on top and planted or allowed to regenerate naturally as part of the NAR. Rehabilitation will be completed within three years of harvest.					
Fire Hazard Abatement (explain measures for slash abatement)					
The current fire hazard is high to extreme. Salvage harvesting and subsequent slash reduction will greatly reduce the potential fire hazard on this site.					
After harvest, excess slash accumulated at the landings (piles) will be burned within two years of harvest. Otherwise, dispersed slash will be left to contribute to Coarse Woody Debris, small fur-bearer habitat and act as a soil carbon and nutrient supply.					

SITE AND HARVEST PLAN

Forest Health (explain measures to reduce current and future risk of forest to disease and insects)								
This area has been severely attacked by spruce beetle (<i>Dendroctonus Rufipennis</i>). The proportion of merchantable stems that are attacked by beetles (Cruise Beetle Codes 5, 6 & 7) is 84%. Harvesting is prescribed to remove these trees and allow for planted and natural regeneration.								
Additional Comments								
9. REFORESTATION AND DESCRIPTION								
SIS #	Stand #	Net Area to Reforest (ha)	Restocking		Target Stocking (SPH)	Assessment Dates Delay to Treat	Regen Surveys	
			Pref Species	Acc Species			Early Stocking	Late Performance
	V17	42.6	Sw	At	1200	H+2	H+5	H+10
Reforestation Plan								
Natural regeneration supplemented with fill planting where necessary.								
Stand Number V17 may be left for up to two (2) years after harvest to facilitate establishment of natural regeneration. A regeneration survey should be conducted at this time and any areas found to be not satisfactorily restocked will be planted no later than four (4) years after harvest. The survey will also specify other remedial actions if necessary.								
Establishment to Assessment Date Concerns								
No Brushing concerns anticipated.								
Additional Comments								
FMB								
Approval by:				Date:				
Position:				Signature:				
10. ATTACHMENTS								
Site and Harvest Plan Map @ 1: 10,000								



**INTEGRATED LANDSCAPE PLAN
TIMBER HARVEST PROJECT**

CHAMPAGNE and AISHIHIK
TRADITIONAL TERRITORY
YUKON, CANADA

**AREA 3
SITE AND HARVEST PLAN MAP**

FMU: Y06
Eco-Region: Ruby Range / Southern Lakes
CATT ILP Zone: Forest Resource Mangement Zone
Sub Zone: Landscape Fuel Abatement
Latitude: 60° 51' 09.0" Longitude: 136° 56' 49.6"
NTS Map Sheet: 115 A
Base Map Information Localized

Area Summary

Area of Interest		53.8	
Landscape Buffers	Area ha	Internal Reserve and Natural NP	Area ha
Wildlife	0.0	Reserve	0.0
Riparian	0.0	Non Timber	0.0
Visual	0.0		
Other	11.2		
Gross Operable Area	42.6	Net Operable Area	42.6

Stand Number	Vegetation Type	Inventory Label	Harvest Season	Area ha
V17	V17	SW10-5B7M	W	42.6
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
Net Area to Reforest			Total	42.6

Cruise Information

Timber Type	Net Operable Area (ha)	Net Available Volume (m3/ha)
All (V17)	All (V17)	5,283

Legend

- Net Operable Area

Non Forested

White Spruce
- 1990-1999 Fires

Balsam Poplar

Trembling Aspen

- Base Map
- Highway

Limited Use Road

Pro Temp Rd(Class 4/5)

Loc Temp Rd(Class 2)

Logging Road

Contour (100ft)
- Trail

Cut Line

Watercourses

Wetland

Waterbody

Dry Riverbed/Sand

Scale 1 : 10,000



INDUSTRIAL FORESTRY SERVICE LTD.
1595 Fifth Avenue
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V2L 3L9
PH: (250) 564-4115 FAX: (250) 563-9679
Date Drawn: Feb 21/07
Date of Field Work: Summer 2007
IFS Job #: 070224
Contract #: FMB 07-01

FOREST MANAGEMENT BRANCH

SITE AND HARVEST PLAN

1. LOCATION								
District			Geographic Location Name				Mapsheet	
Kluane			Haines Junction Area				115A	
FMU			Latitude		Longitude		SIS#	
Y06			60° 51' 01.5"		136° 59' 09.1"			
Development Area			Block Number			Air Photo Numbers		
Canyon Landscape Unit			6			N/A		
2. ECOLOGY AND SITE CONDITION								
Eco-Region			Vegetation Type			Soil Type / Soil Texture		
Ruby Range / Southern Lakes			V17			S3/SiL		
Elevation (m)	Slope (%)	Aspect	Terrain	Slope Position	Moist Regime	Soil Drainage	LFH Depth (cm)	NDZ
685-790	10	S	Rolling	Mid	Fresh	Well	9	Simple Upland (3)
3. BLOCK AREA SUMMARY IN HECTARE								
Area of Interest (ha)	Wildlife Buffers (ha)	Riparian Buffers (ha)	Visual Buffers (ha)	Other Buffers (ha)	Reserve (ha)	Non Timber (ha)	Perm Roads Landings (ha)	Net Area to Reforest (ha)
179.8	25.4		18.2	44.5		5.1		86.6
4. HARVEST STAND DESCRIPTION								
Stand Number	Merch Area (ha)	Species	Crown Closure	Age (years)	Avg. Height (m)	Avg. DBH (cm)	Est. Vol/Ha (m³/ha)	
All (V17)	86.6	Sw10	20%	118	15.2	17.8	103	
5. RIPARIAN MANAGEMENT								
Riparian ID#	Class (Stream Wetland Lake)	Reserve Zone Width (m)	Rationale For Reserve	Mngmt Zone Width (m)	Strategies for Management Zone			
N/A	N/A	N/A	N/A	N/A	N/A			
Riparian Comments :								
1. Reserves and Management Zones are as per the <i>Timber Harvest Planning and Operating Guidebook</i> .								
2. Riparian Features are the basis of the <i>CATT Habitat Connectivity Planning Recommendations</i> .								

SITE AND HARVEST PLAN

6. STAND MANAGEMENT OBJECTIVES

HIGHER LEVEL AND OTHER PLANS

This Site and Harvest Plan is consistent with:

- The guiding principles of the *Strategic Forest Management Plan for the Champagne and Aishihik Traditional Territory (CATT)*,
- The *CATT Integrated Landscape Plan* which defines the management priorities and guidelines for Timber Harvest Project Planning.
- And the *CATT Regional Timber Harvesting Project Within The Pine Lake and Canyon Landscape Units* which links the above Landscape Level Strategies, Management Priorities and Guidelines to this Stand Level Operational Plan.

STAND-LEVEL OBJECTIVES

Discuss non-timber values that may be affected by the proposed treatment and measures proposed to accommodate these Traditional or First Nations

As per the *CATT ILP Heritage and Cultural Guidelines* (section 3.8). Qualified Champagne and Aishihik personnel must conduct a pre-harvest field assessment.

No potential cultural or heritage resource features were noted within the harvest area during the reconnaissance and cruising phases.

If a previously unidentified cultural or heritage resource is encountered during the harvesting or road building operations, operations will cease to the extent necessary to ensure its protection until an assessment can be carried out.

Wildlife Values

As per the *CATT ILP Forest Ecosystems, Wildlife, and Biological Diversity Guidelines* (section 3.5) appropriate wildlife movement corridors have been maintained at the landscape level focusing on riparian management areas while stand level buffers, reserves and retention have are provided as on block elements to enhance and complement the landscape connectivity. In addition, there are no “Species at Risk” that will be adversely impacted by harvesting on this site.

This block is located within the *CATT ILP FRMZ High Wildlife Value Area*. Therefore all harvest blocks must average 25% retention of stand structure with a range of 10-30%. The total amount of retention in this block (Buffers, Reserves and dispersed leave trees) is 49% by volume.

As per the *Best Management Practices For Northern Goshawk Habitat In The Yukon Territory* any large stick nests found were buffered from harvest by a minimum 200m no-harvest zone connected to the outside of the harvest area.

This block meets all connectivity requirements outlined in the *Habitat Connectivity Planning Recommendations For Forest harvest Planning In The Champagne And Aishihik Traditional Territory*

Fish Water Values

As per the *CATT ILP Watershed and Riparian Management Guidelines* (section 3.6) the cumulative area of this and all other blocks in this landscape unit does not exceed 20% of the watershed area. In addition, the *THPOG* guidelines have been followed for all classified streams in or adjacent to this block (see section 5 *Riparian Management* of this S&HP). All streams encountered were defaulted to fish bearing.

SITE AND HARVEST PLAN

Recr Visual Values					
As per section 3.7 of the CATT ILP, visual concerns adjacent to the Alaska Highway have been addressed by leaving an un-harvested buffer. The minimum width for this area of interest is 60m.					
Other Values					
Fuel Abatement: This area is located in the <i>CATT ILP Forest Resource Management Zone</i> and <i>Landscape Fuel Abatement Subzone</i> . As such, it meets the management objectives of: <ol style="list-style-type: none"> 1. being a stand with >30% beetle attack. 2. having a size, shape and location that “enhances fuel discontinuity”. 3. has a stand structure that allows the implementation silviculture principles to reduce the fire hazard. 4. being close to the Alaska Highway and the communities of Haines Junction and Canyon. 					
<u>Access</u> There are some existing trails in this block. The proponent may want to assess the feasibility of utilizing these trails to access the block.					
7. SILVICULTURE SYSTEM DESCRIPTION					
STAND NUMBER	SILVICULTURE SYSTEM	SEASON	RATIONALE		
V17	Natural Shelterwood	Winter	Winter harvest is required due to very high soil compaction hazard.		
Dispersed Retention Leave Tree Specs					
For the V17 Type the target for dispersed retention will be to leave all Deciduous trees and all Non-beetle attacked spruce including as much of the advanced regeneration in the understory as possible. The minimum level of understory retention will be at least 50% of the pre-harvest stems per hectare.					
Special Management Zone Leave Tree Specs					
Not Applicable					
8. SOIL CONSERVATION					
ON BLOCK PERMANENT DISTURBANCE CALCULATION TAB					
Disturbance Type (Road/landing)	Identification (Name / Number)	Road Standard	Length (m)	Width (m)	Total Area L x W /10,000 (ha)
N/A	N/A	N/A	N/A	N/A	N/A
Road Area	Landing Area	Total Area	Block Gross Area	Block Net Area	% Disturb. Of Gross Area
N/A	N/A	N/A	N/A	N/A	No permanent roads or landings
Depth of LFH	Hazard Ratings			Permafrost or Frost Heaving	Proposed Harvest Season
	Compaction	Surface Erosion	Displacement		
9cm	Very High	High	Moderate	No permafrost	Winter
Proportion of Temporary Access Within Net Area to be reforested (explain rehabilitation measures)					
The proportion of temporary access within the NAR will not exceed 10%. These roads and landings will be ripped (as needed) have organic debris scattered on top and planted or allowed to regenerate naturally as part of the NAR. Rehabilitation will be completed within three years of harvest.					
Fire Hazard Abatement (explain measures for slash abatement)					
The current fire hazard is high to extreme. Salvage harvesting and subsequent slash reduction will greatly reduce the					

SITE AND HARVEST PLAN

potential fire hazard on this site.

After harvest, excess slash accumulated at the landings (piles) will be burned within two years of harvest. Otherwise, dispersed slash will be left to contribute to Coarse Woody Debris, small fur-bearer habitat and act as a soil carbon and nutrient supply.

Forest Health (explain measures to reduce current and future risk of forest to disease and insects)

This area has been severely attacked by spruce beetle (*Dendroctonus Rufipennis*). The proportion of merchantable stems that are attacked by beetles (Cruise Beetle Codes 5, 6 & 7) is 66%. Harvesting is prescribed to remove these trees and allow for planted and natural regeneration.

Ips preturbatus has also been observed affecting smaller spruce in this block and adjacent forest.

Additional Comments

9. REFORESTATION AND DESCRIPTION

SIS #	Stand #	Net Area to Reforest (ha)	Restocking		Target Stocking (SPH)	Assessment Dates		
			Pref Species	Acc Species		Delay to Treat	Regen Surveys	
							Early Stocking	Late Performance
	V17	86.6	Sw	At	1200	H+2	H+5	H+10

Reforestation Plan

Natural regeneration supplemented with fill planting where necessary.

Stand Number V17 may be left for up to two (2) years after harvest to facilitate establishment of natural regeneration. A regeneration survey should be conducted at this time and any areas found to be not satisfactorily restocked will be planted no later than four (4) years after harvest. The survey will also specify other remedial actions if necessary.

Establishment to Assessment Date Concerns

No Brushing concerns anticipated.

Additional Comments

FMB

Approval by:

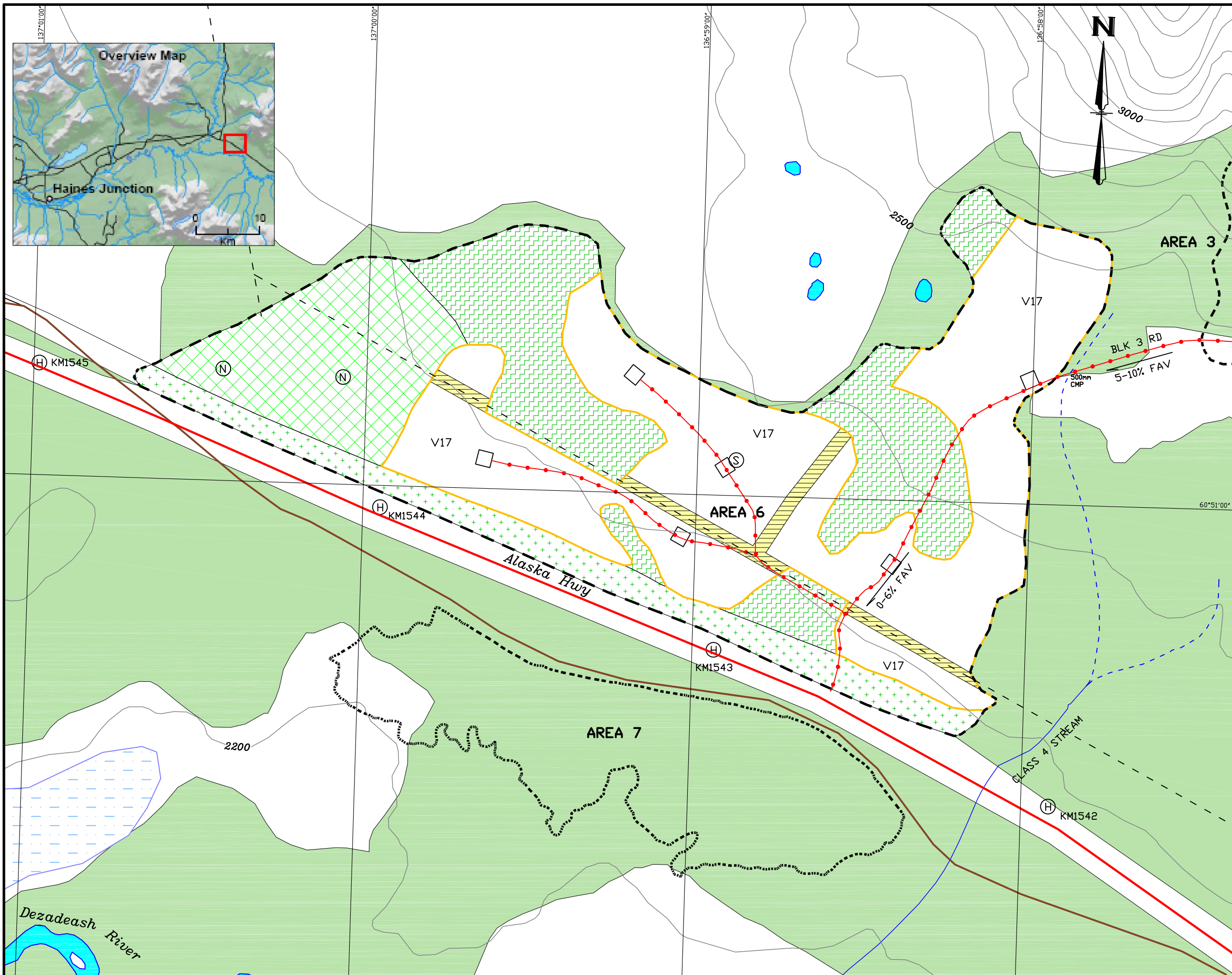
Date:

Position:

Signature:

10. ATTACHMENTS

Site and Harvest Plan Map @ 1: 10,000



INTEGRATED LANDSCAPE PLAN

TIMBER HARVEST PROJECT

CHAMPAGNE and AISHIHIK

TRADITIONAL TERRITORY

YUKON, CANADA

AREA 6

SITE AND HARVEST PLAN MAP

FMU: Y06

Eco-Region: Ruby Range / Southern Lakes

CATT ILP Zone: Forest Resource Management Zone

Sub Zone: Landscape Fuel Abatement

Latitude: 60° 51' 01.5" Longitude: 136° 59' 09.1"

NTS Map Sheet: 115 A

Base Map Information Localized

Area Summary

Area of Interest		179.8	
Landscape Buffers	Area ha	Internal Reserve and Natural NP	Area ha
Wildlife	25.4	Reserve	0.0
Riparian	0.0	Non Timber	5.1
Visual	18.2		
Other	44.5		
Gross Operable Area	91.7	Net Operable Area	86.6

Stand Number	Vegetation Type	Inventory Label	Harvest Season	Area ha
V17	V17	SW10-4B6M	W	86.6
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
Net Area to Reforest				Total 86.6

Cruise Information

Timber Type	Net Operable Area (ha)	Net Available Volume (m3/ha)
All (V17)	All (V17)	8,887

Legend

Net Operable Area

Non Forested

White Spruce

1990-1999 Fires

Balsam Poplar

Trembling Aspen

Base Map

Highway

Limited Use Road

Pro Temp Rd(Class 4/5)

Loc Temp Rd(Class 2)

Logging Road

Contour (100ft)

Trail

Cut Line

Watercourses

Wetland

Waterbody

Dry Riverbed/Sand

Scale 1 : 10,000

100 50 0 100 200 300 400 500

IFS

INDUSTRIAL FORESTRY SERVICE LTD.

1595 Fifth Avenue

Prince George, B.C.

V2L 3L9

PH: (250) 564-4115

PH: (250) 563-9679

Date Drawn: Feb 21/07

Date of Field Work: Summer 2007

IFS Job #: 070224

Contract #: FMB 07-01

FOREST MANAGEMENT BRANCH

SITE AND HARVEST PLAN

1. LOCATION								
District			Geographic Location Name				Mapsheet	
Kluane			Haines Junction Area				115A	
FMU			Latitude		Longitude		SIS#	
Y06			60° 50' 38.7"		136° 59' 21.8"			
Development Area			Block Number			Air Photo Numbers		
Canyon Landscape Unit			7			N/A		
2. ECOLOGY AND SITE CONDITION								
Eco-Region			Vegetation Type			Soil Type / Soil Texture		
Ruby Range / Southern Lakes			V17			S5/SiCL		
Elevation (m)	Slope (%)	Aspect	Terrain	Slope Position	Moist Regime	Soil Drainage	LFH Depth (cm)	NDZ
670-690	3	S	Even	Mid	Fresh	Well-Mod.Well	5	Simple Upland (3)
3. BLOCK AREA SUMMARY IN HECTARE								
Area of Interest (ha)	Wildlife Buffers (ha)	Riparian Buffers (ha)	Visual Buffers (ha)	Other Buffers (ha)	Reserve (ha)	Non Timber (ha)	Perm Roads Landings (ha)	Net Area to Reforest (ha)
50.8	8.8			10.7				31.3
4. HARVEST STAND DESCRIPTION								
Stand Number	Merch Area (ha)	Species	Crown Closure	Age (years)	Avg. Height (m)	Avg. DBH (cm)	Est. Vol/Ha (m³/ha)	
All (V17)	31.3	Sw8At2	10%	99	14.1	18.8	76	
5. RIPARIAN MANAGEMENT								
Riparian ID#	Class (Stream Wetland Lake)	Reserve Zone Width (m)	Rationale For Reserve	Mngmt Zone Width (m)	Strategies for Management Zone			
N/A	N/A	N/A	N/A	N/A	N/A			
Riparian Comments :								
1. Reserves and Management Zones are as per the <i>Timber Harvest Planning and Operating Guidebook</i> .								
2. Riparian Features are the basis of the <i>CATT Habitat Connectivity Planning Recommendations</i> .								

SITE AND HARVEST PLAN

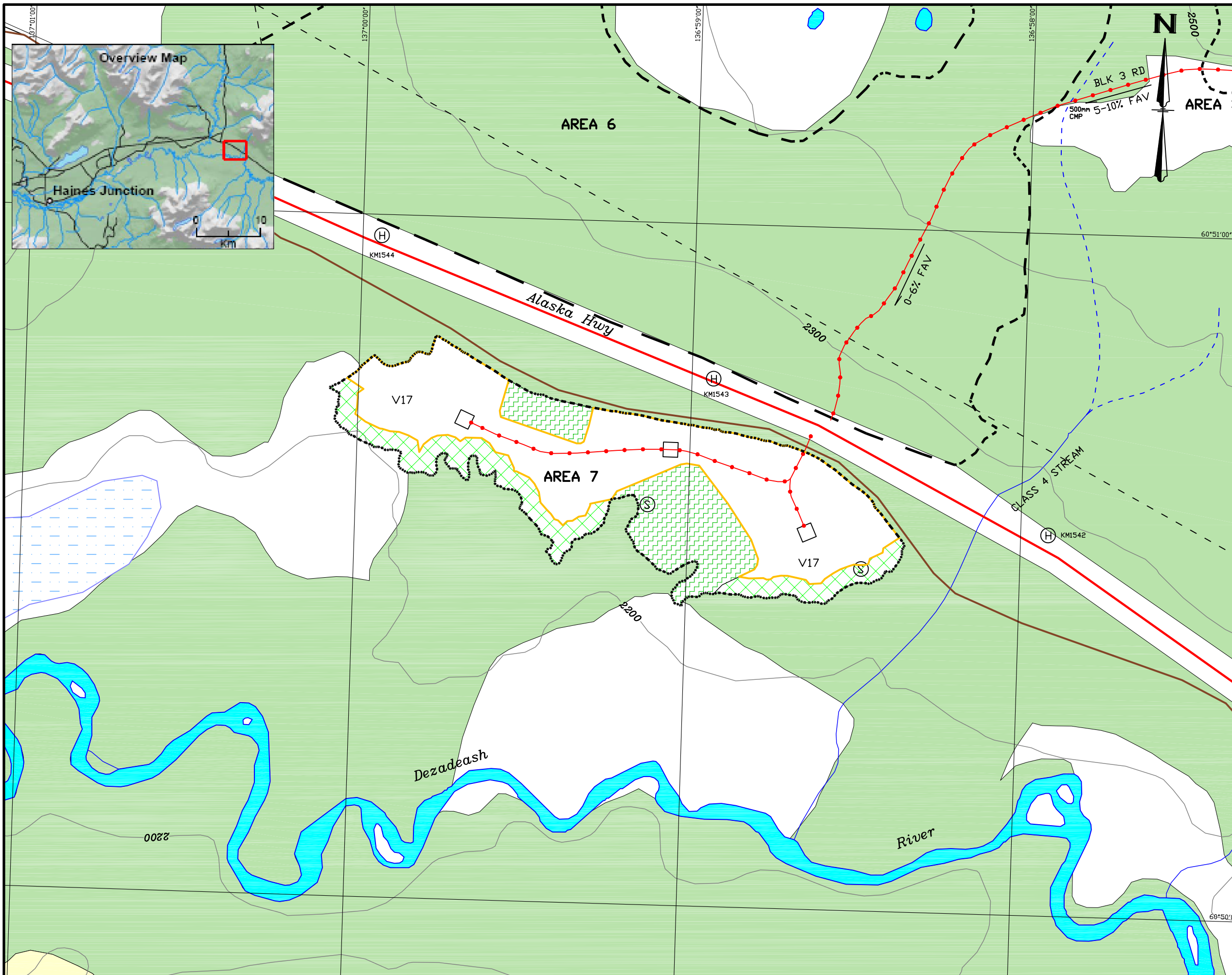
6. STAND MANAGEMENT OBJECTIVES
HIGHER LEVEL AND OTHER PLANS
<p>This Site and Harvest Plan is consistent with:</p> <ul style="list-style-type: none"> • The guiding principles of the <i>Strategic Forest Management Plan for the Champagne and Aishihik Traditional Territory (CATT)</i>, • The <i>CATT Integrated Landscape Plan</i> which defines the management priorities and guidelines for Timber Harvest Project Planning. • And the <i>CATT Regional Timber Harvesting Project Within The Pine Lake and Canyon Landscape Units</i> which links the above Landscape Level Strategies, Management Priorities and Guidelines to this Stand Level Operational Plan.
STAND-LEVEL OBJECTIVES
Discuss non-timber values that may be affected by the proposed treatment and measures proposed to accommodate these Traditional or First Nations
<p>As per the <i>CATT ILP Heritage and Cultural Guidelines</i> (section 3.8). Qualified Champagne and Aishihik personnel must conduct a pre-harvest field assessment.</p> <p>No potential cultural or heritage resource features were noted within the harvest area during the reconnaissance and cruising phases although consultation with CAFN citizens indicates high potential for first nation heritage value on a portion of the block that is already covered by a wildlife buffer. A field check by CAFN for first nation heritage values will be completed on the block prior to harvest.</p> <p>If a previously unidentified cultural or heritage resource is encountered during the harvesting or road building operations, operations will cease to the extent necessary to ensure its protection until an assessment can be carried out.</p>
Wildlife Values
<p>As per the <i>CATT ILP Forest Ecosystems, Wildlife, and Biological Diversity Guidelines</i> (section 3.5) appropriate wildlife movement corridors have been maintained at the landscape level focusing on riparian management areas while stand level buffers, reserves and retention have are provided as on block elements to enhance and complement the landscape connectivity. In addition, there are no “Species at Risk” that will be adversely impacted by harvesting on this site.</p> <p>This block is located within the <i>CATT ILP FRMZ High Wildlife Value Area</i>. Therefore all harvest blocks must average 25% retention of stand structure with a range of 10-30%. The total amount of retention in this block (Buffers, Reserves and dispersed leave trees) is 44% by volume.</p> <p>A visual screen will be maintained along the old Alaska highway.</p> <p>This block meets all connectivity requirements outlined in the <i>Habitat Connectivity Planning Recommendations For Forest harvest Planning In The Champagne And Aishihik Traditional Territory</i></p>
Fish Water Values
<p>As per the <i>CATT ILP Watershed and Riparian Management Guidelines</i> (section 3.6) the cumulative area of this and all other blocks in this landscape unit does not exceed 20% of the watershed area. In addition, the <i>THPOG</i> guidelines have been followed for all classified streams in or adjacent to this block (see section 5 <i>Riparian Management</i> of this S&HP). All streams encountered were defaulted to fish bearing.</p>
Recr Visual Values
Not Applicable

SITE AND HARVEST PLAN

Other Values					
<p>Fuel Abatement: This area is located in the <i>CATT ILP Forest Resource Management Zone</i> and <i>Landscape Fuel Abatement Subzone</i>. As such, it meets the management objectives of:</p> <ol style="list-style-type: none"> 1. having a size, shape and location that “enhances fuel discontinuity”. 2. has a stand structure that allows the implementation silviculture principles to reduce the fire hazard. 3. being close to the Alaska Highway and the communities of Haines Junction and Canyon. <p><u>Access</u> There are some existing trails into this block on the west side. The proponent may want to assess the feasibility of utilizing these trails to access the block.</p>					
7. SILVICULTURE SYSTEM DESCRIPTION					
STAND NUMBER	SILVICULTURE SYSTEM	SEASON	RATIONALE		
V17	Natural Shelterwood	Winter	Winter harvest is required due to very high soil compaction hazard.		
Dispersed Retention Leave Tree Specs					
For the V17 Type the target for dispersed retention will be to leave all Deciduous trees and all Non-beetle attacked spruce including as much of the advanced regeneration in the understory as possible. The minimum level of understory retention will be at least 50% of the pre-harvest stems per hectare.					
Special Management Zone Leave Tree Specs					
Not Applicable					
8. SOIL CONSERVATION					
ON BLOCK PERMANENT DISTURBANCE CALCULATION TAB					
Disturbance Type (Road/landing)	Identification (Name / Number)	Road Standard	Length (m)	Width (m)	Total Area L x W /10,000 (ha)
N/A	N/A	N/A	N/A	N/A	N/A
Road Area	Landing Area	Total Area	Block Gross Area	Block Net Area	% Disturb. Of Gross Area
N/A	N/A	N/A	N/A	N/A	No permanent roads or landings
Depth of LFH	Hazard Ratings			Permafrost or Frost Heaving	Proposed Harvest Season
	Compaction	Surface Erosion	Displacement		
5cm	Very High	Moderate	Moderate	No permafrost	Winter
Proportion of Temporary Access Within Net Area to be reforested (explain rehabilitation measures)					
The proportion of temporary access within the NAR will not exceed 10%. These roads and landings will be ripped (as needed) have organic debris scattered on top and planted or allowed to regenerate naturally as part of the NAR. Rehabilitation will be completed within three years of harvest.					
Fire Hazard Abatement (explain measures for slash abatement)					
<p>The current fire hazard is high to extreme. Salvage harvesting and subsequent slash reduction will greatly reduce the potential fire hazard on this site.</p> <p>After harvest, excess slash accumulated at the landings (piles) will be burned within two years of harvest. Otherwise, dispersed slash will be left to contribute to Coarse Woody Debris, small fur-bearer habitat and act as a soil carbon and nutrient supply.</p>					

SITE AND HARVEST PLAN

Forest Health (explain measures to reduce current and future risk of forest to disease and insects)								
<p>This area has been attacked by spruce beetle (<i>Dendroctonus Rufipennis</i>). The proportion of merchantable stems that are attacked by beetles (Cruise Beetle Codes 5, 6 & 7) is 19%. Although only 19% of the stems in this unit are beetle attacked, this constitutes 27% of the volume because larger diameter trees are all attacked. In addition, 100% of the attacked trees are dead. Harvesting is prescribed to remove these trees and allow for planted and natural regeneration.</p>								
Additional Comments								
9. REFORESTATION AND DESCRIPTION								
SIS #	Stand #	Net Area to Reforest (ha)	Restocking		Target Stocking (SPH)	Assessment Dates Delay to Treat	Regen Surveys	
			Pref Species	Acc Species			Early Stocking	Late Performance
	V17	31.3	Sw	At	1200	H+2	H+5	H+10
Reforestation Plan								
<p>Natural regeneration supplemented with fill planting where necessary.</p> <p>Stand Number V17 may be left for up to two (2) years after harvest to facilitate establishment of natural regeneration. A regeneration survey should be conducted at this time and any areas found to be not satisfactorily restocked will be planted no later than four (4) years after harvest. The survey will also specify other remedial actions if necessary.</p>								
Establishment to Assessment Date Concerns								
No Brushing concerns anticipated.								
Additional Comments								
FMB								
Approval by:				Date:				
Position:				Signature:				
10. ATTACHMENTS								
<p style="text-align: center;">Site and Harvest Plan Map @ 1: 10,000</p>								



INTEGRATED LANDSCAPE PLAN TIMBER HARVEST PROJECT

CHAMPAGNE and AISHIHIK
TRADITIONAL TERRITORY
YUKON, CANADA

AREA 7 SITE AND HARVEST PLAN MAP

FMU: Y06
Eco-Region: Ruby Range / Southern Lakes
CATT ILP Zone: Forest Resource Management Zone
Sub Zone: Landscape Fuel Abatement
Latitude: 60° 50' 38.7" Longitude: 136° 59' 21.8"
NTS Map Sheet: 115 A
Base Map Information Localized

Area Summary

Area of Interest		50.8	
Landscape Buffers	Area ha	Internal Reserve and Natural NP	Area ha
Wildlife	8.8	Reserve	0.0
Riparian	0.0	Non Timber	0.0
Visual	0.0		
Other	10.7		
Gross Operable Area	31.3	Net Operable Area	31.3

Stand Number	Vegetation Type	Inventory Label	Harvest Season	Area ha
V17	V17	SW8A2-4A5M	W	31.3
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
Net Area to Reforest				Total 31.3

Cruise Information

Timber Type	Net Operable Area (ha)	Net Available Volume (m3/ha)
All (V17)	All (V17)	2,371

Legend

Net Operable Area

Non Forested

White Spruce

1990-1999 Fires

Balsam Poplar

Trembling Aspen

Base Map

Highway

Limited Use Road

Pro Temp Rd(Class 4/5)

Loc Temp Rd(Class 2)

Logging Road

Contour (100ft)

Trail

Cut Line

Watercourses

Wetland

Waterbody

Dry Riverbed/Sand

Scale 1 : 10,000

100 50 0 100 200 300 400 500

INDUSTRIAL FORESTRY SERVICE LTD.
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Date Drawn: Feb 21/07
Date of Field Work: Summer 2007
IFS Job #: 070224
Contract #: FMB 07-01

FOREST MANAGEMENT BRANCH

SITE AND HARVEST PLAN

1. LOCATION									
District		Geographic Location Name					Mapsheet		
Kluane		Haines Junction Area					115A		
FMU		Latitude		Longitude		SIS#			
Y06		60° 50' 27.5"		137° 03' 31.4"					
Development Area			Block Number			Air Photo Numbers			
Canyon Landscape Unit			9			N/A			
2. ECOLOGY AND SITE CONDITION									
Eco-Region			Vegetation Type			Soil Type / Soil Texture			
Ruby Range / Southern Lakes			V17			S2/LS			
Elevation (m)	Slope (%)	Aspect	Terrain	Slope Position	Moist Regime	Soil Drainage	LFH Depth (cm)	NDZ	
640-655	5	SW	Even	Crest	Dry-Mod.Fresh	Well	4	Simple Upland (3)	
3. BLOCK AREA SUMMARY IN HECTARE									
Area of Interest (ha)	Wildlife Buffers (ha)	Riparian Buffers (ha)	Visual Buffers (ha)	Other Buffers (ha)	Reserve (ha)	Non Timber (ha)	Perm Roads Landings (ha)	Net Area to Reforest (ha)	
68.0	11.3			6.0	1.9			48.8	
4. HARVEST STAND DESCRIPTION									
Stand Number	Merch Area (ha)	Species	Crown Closure	Age (years)	Avg. Height (m)	Avg. DBH (cm)	Est. Vol/Ha (m³/ha)		
All (V17)	48.8	Sw10	15%	134	13.8	18.6	107		
5. RIPARIAN MANAGEMENT									
Riparian ID#	Class (Stream Wetland Lake)	Reserve Zone Width (m)	Rationale For Reserve	Mngmt Zone Width (m)	Strategies for Management Zone				
Dezadeash R.	Class 2 Stream. (5-20m wide)	60	Fish/Water & Connectivity	80	No Harvest				
Riparian Comments :									
1. Reserves and Management Zones are as per the <i>Timber Harvest Planning and Operating Guidebook</i> .									
2. Riparian Features are the basis of the <i>CATT Habitat Connectivity Planning Recommendations</i> .									

SITE AND HARVEST PLAN

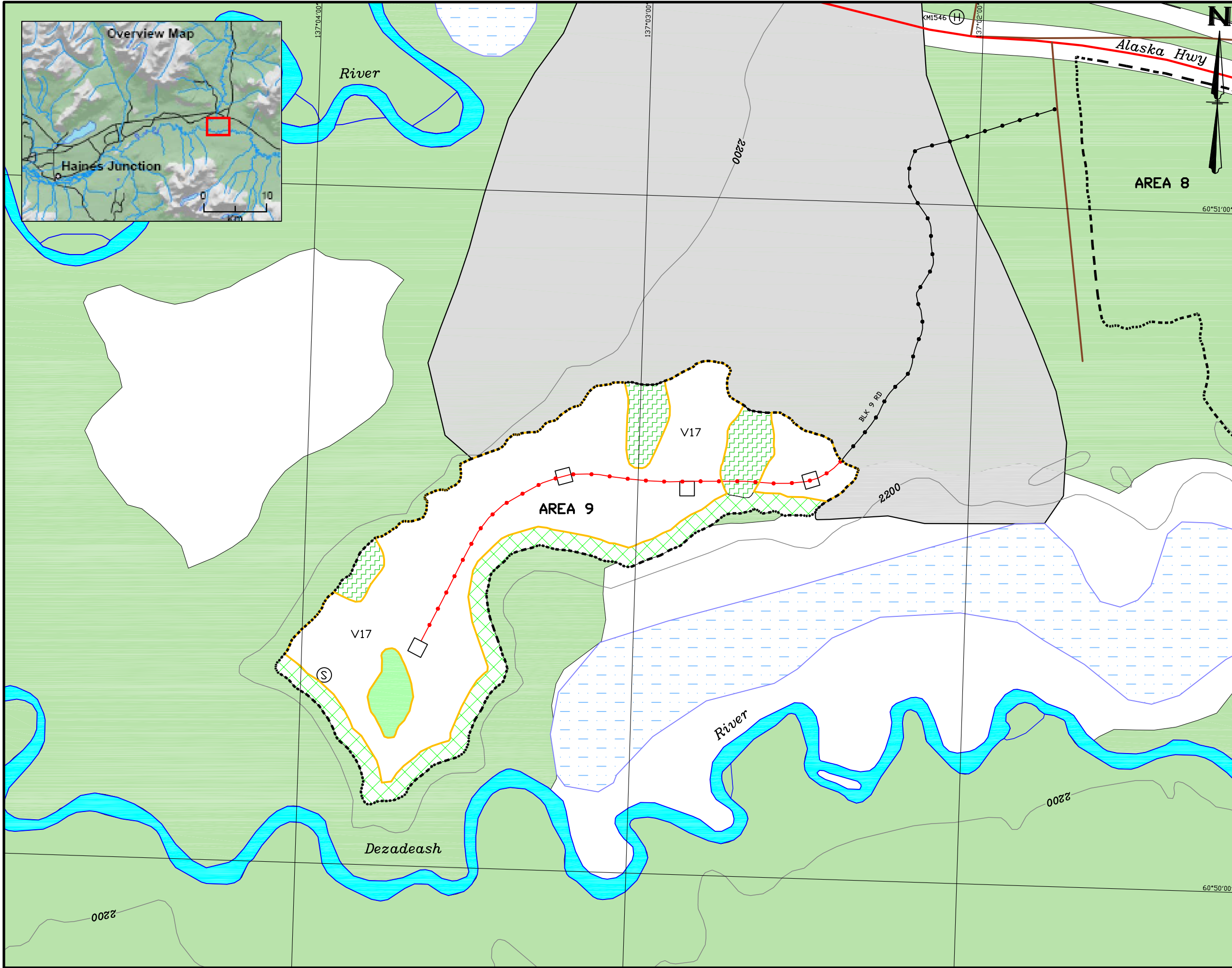
6. STAND MANAGEMENT OBJECTIVES
HIGHER LEVEL AND OTHER PLANS
<p>This Site and Harvest Plan is consistent with:</p> <ul style="list-style-type: none"> • The guiding principles of the <i>Strategic Forest Management Plan for the Champagne and Aishihik Traditional Territory (CATT)</i>, • The <i>CATT Integrated Landscape Plan</i> which defines the management priorities and guidelines for Timber Harvest Project Planning. • And the <i>CATT Regional Timber Harvesting Project Within The Pine Lake and Canyon Landscape Units</i> which links the above Landscape Level Strategies, Management Priorities and Guidelines to this Stand Level Operational Plan.
STAND-LEVEL OBJECTIVES
Discuss non-timber values that may be affected by the proposed treatment and measures proposed to accommodate these Traditional or First Nations
<p>Consultation with First Nation individuals indicates high potential for heritage sites along the southern edge of this block. As per the <i>CATT ILP Heritage and Cultural Guidelines</i> (section 3.8). Qualified Champagne and Aishihik personnel must conduct a pre-harvest field assessment.</p> <p>No potential cultural or heritage resource features were noted within the harvest area during the reconnaissance and cruising phases.</p> <p>If a previously unidentified cultural or heritage resource is encountered during the harvesting or road building operations, operations will cease to the extent necessary to ensure its protection until an assessment can be carried out.</p>
Wildlife Values
<p>As per the <i>CATT ILP Forest Ecosystems, Wildlife, and Biological Diversity Guidelines</i> (section 3.5) appropriate wildlife movement corridors have been maintained at the landscape level focusing on riparian management areas while stand level buffers, reserves and retention have are provided as on block elements to enhance and complement the landscape connectivity. In addition, there are no “Species at Risk” that will be adversely impacted by harvesting on this site.</p> <p>This block is located within the <i>CATT ILP FRMZ High Wildlife Value Area</i>. Therefore all harvest blocks must average 25% retention of stand structure with a range of 10-30%. The total amount of retention in this block (Buffers, Reserves and dispersed leave trees) is 30% by volume.</p> <p>This block meets all connectivity requirements outlined in the <i>Habitat Connectivity Planning Recommendations For Forest harvest Planning In The Champagne And Aishihik Traditional Territory</i></p>
Fish Water Values
<p>As per the <i>CATT ILP Watershed and Riparian Management Guidelines</i> (section 3.6) the cumulative area of this and all other blocks in this landscape unit does not exceed 20% of the watershed area. In addition, the <i>THPOG</i> guidelines have been followed for all classified streams in or adjacent to this block (see section 5 <i>Riparian Management</i> of this S&HP). All streams encountered were defaulted to fish bearing.</p>
Recr Visual Values
Not Applicable

SITE AND HARVEST PLAN

Other Values					
Fuel Abatement: This area is located in the <i>CATT ILP Forest Resource Management Zone</i> and <i>Landscape Fuel Abatement Subzone</i> . As such, it meets the management objectives of: <ol style="list-style-type: none"> 1. being a stand with >30% beetle attack. 2. having a size, shape and location that “enhances fuel discontinuity”. 3. has a stand structure that allows the implementation silviculture principles to reduce the fire hazard. 4. being close to the Alaska Highway and the communities of Haines Junction and Canyon. 					
7. SILVICULTURE SYSTEM DESCRIPTION					
STAND NUMBER	SILVICULTURE SYSTEM	SEASON	RATIONALE		
V17	Natural Shelterwood	Winter	Coarse textured soils will facilitate both winter and dry summer harvest.		
Dispersed Retention Leave Tree Specs					
For the V17 Type the target for dispersed retention will be to leave all Deciduous trees and all Non-beetle attacked spruce including as much of the advanced regeneration in the understory as possible. The minimum level of understory retention will be at least 50% of the pre-harvest stems per hectare.					
Special Management Zone Leave Tree Specs					
Not Applicable					
8. SOIL CONSERVATION					
ON BLOCK PERMANENT DISTURBANCE CALCULATION TAB					
Disturbance Type (Road/landing)	Identification (Name / Number)	Road Standard	Length (m)	Width (m)	Total Area L x W /10,000 (ha)
N/A	N/A	N/A	N/A	N/A	N/A
Road Area	Landing Area	Total Area	Block Gross Area	Block Net Area	% Disturb. Of Gross Area
N/A	N/A	N/A	N/A	N/A	No permanent roads or landings
Depth of LFH	Hazard Ratings			Permafrost or Frost Heaving	Proposed Harvest Season
	Compaction	Surface Erosion	Displacement		
4cm	Low	Moderate	Low	No permafrost	Winter
Proportion of Temporary Access Within Net Area to be reforested (explain rehabilitation measures)					
The proportion of temporary access within the NAR will not exceed 10%. These roads and landings will be ripped (as needed) have organic debris scattered on top and planted or allowed to regenerate naturally as part of the NAR. Rehabilitation will be completed within three years of harvest.					
Fire Hazard Abatement (explain measures for slash abatement)					
The current fire hazard is high to extreme. Salvage harvesting and subsequent slash reduction will greatly reduce the potential fire hazard on this site.					
After harvest, excess slash accumulated at the landings (piles) will be burned within two years of harvest. Otherwise, dispersed slash will be left to contribute to Coarse Woody Debris, small fur-bearer habitat and act as a soil carbon and nutrient supply.					

SITE AND HARVEST PLAN

Forest Health (explain measures to reduce current and future risk of forest to disease and insects)								
This area has been severely attacked by spruce beetle (<i>Dendroctonus Rufipennis</i>). The proportion of merchantable stems that are attacked by beetles (Cruise Beetle Codes 5, 6 & 7) is 46%. Harvesting is prescribed to remove these trees and allow for planted and natural regeneration.								
Additional Comments								
9. REFORESTATION AND DESCRIPTION								
SIS #	Stand #	Net Area to Reforest (ha)	Restocking		Target Stocking (SPH)	Assessment Dates Delay to Treat	Regen Surveys	
			Pref Species	Acc Species			Early Stocking	Late Performance
	V17	48.8	Sw	At	1200	H+2	H+5	H+10
Reforestation Plan								
Natural regeneration supplemented with fill planting where necessary.								
Stand Number V17 may be left for up to two (2) years after harvest to facilitate establishment of natural regeneration. A regeneration survey should be conducted at this time and any areas found to be not satisfactorily restocked will be planted no later than four (4) years after harvest. The survey will also specify other remedial actions if necessary.								
Establishment to Assessment Date Concerns								
No Brushing concerns anticipated.								
Additional Comments								
FMB								
Approval by:				Date:				
Position:				Signature:				
10. ATTACHMENTS								
Site and Harvest Plan Map @ 1: 10,000								



INTEGRATED LANDSCAPE PLAN TIMBER HARVEST PROJECT

CHAMPAGNE and AISHIHIK
TRADITIONAL TERRITORY
YUKON, CANADA

AREA 9

SITE AND HARVEST PLAN MAP

FMU: Y06
Eco-Region: Ruby Range / Southern Lakes
CATT ILP Zone: Forest Resource Mangement Zone
Sub Zone: Landscape Fuel Abatement
Latitude: 60° 50' 27.5" Longitude: 137° 03' 31.4"
NTS Map Sheet: 115 A
Base Map Information Localized

Area Summary

Area of Interest		68.0
Landscape Buffers	Area ha	Internal Reserve and Natural NP
Wildlife	11.3	Reserve
Riparian	0.0	Non Timber
Visual	0.0	
Other	6.0	
Gross Operable Area	50.7	Net Operable Area
		48.8

Stand Number	Vegetation Type	Inventory Label	Harvest Season	Area ha
V17	V17	SW10-3B5M	W	48.8
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
Net Area to Reforest			Total	48.8

Cruise Information

Timber Type	Net Operable Area (ha)	Net Available Volume (m3/ha)
All (V17)	All (V17)	5,241

Legend

- Net Operable Area
- Non Forested
- White Spruce
- 1990-1999 Fires
- Balsam Poplar
- Trembling Aspen
- Base Map
- Highway
- Limited Use Road
- Pro Temp Rd(Class 4/5)
- Loc Temp Rd(Class 2)
- Logging Road
- Contour (100ft)
- Trail
- Cut Line
- Watercourses
- Wetland
- Waterbody
- Dry Riverbed/Sand

Scale 1 : 10,000



INDUSTRIAL FORESTRY SERVICE LTD.
1595 Fifth Avenue
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V2L 3L9
PH: (250) 564-4115 FAX: (250) 563-9679
Date Drawn: Feb 21/07
Date of Field Work: Summer 2007
IFS Job #: 070224
Contract #: FMB 07-01

FOREST MANAGEMENT BRANCH

SITE AND HARVEST PLAN

1. LOCATION								
District			Geographic Location Name				Mapsheet	
Kluane			Haines Junction Area				115A	
FMU			Latitude		Longitude		SIS#	
Y06			60° 53' 59.8"		137° 01' 59.8"			
Development Area			Block Number			Air Photo Numbers		
Canyon Landscape Unit			10			N/A		
2. ECOLOGY AND SITE CONDITION								
Eco-Region			Vegetation Type			Soil Type / Soil Texture		
Ruby Range / Southern Lakes			V17			S3-S6/SiL-SiC-C		
Elevation (m)	Slope (%)	Aspect	Terrain	Slope Position	Moist Regime	Soil Drainage	LFH Depth (cm)	NDZ
705-755	5	W	Even	Level	Fresh	Well-Mod.Well	5	Simple Upland (3)
3. BLOCK AREA SUMMARY IN HECTARE								
Area of Interest (ha)	Wildlife Buffers (ha)	Riparian Buffers (ha)	Visual Buffers (ha)	Other Buffers (ha)	Reserve (ha)	Non Timber (ha)	Perm Roads Landings (ha)	Net Area to Reforest (ha)
73.0	16.2		5.1					51.7
4. HARVEST STAND DESCRIPTION								
Stand Number	Merch Area (ha)	Species	Crown Closure	Age (years)	Avg. Height (m)	Avg. DBH (cm)	Est. Vol/Ha (m³/ha)	
All (V17)	51.7	Sw10	10%	121	14.5	20.4	74	
5. RIPARIAN MANAGEMENT								
Riparian ID#	Class (Stream Wetland Lake)	Reserve Zone Width (m)	Rationale For Reserve	Mngmt Zone Width (m)	Strategies for Management Zone			
N/A	N/A	N/A	N/A	N/A	N/A			
Riparian Comments :								
1. Reserves and Management Zones are as per the <i>Timber Harvest Planning and Operating Guidebook</i> .								
2. Riparian Features are the basis of the <i>CATT Habitat Connectivity Planning Recommendations</i> .								

SITE AND HARVEST PLAN

6. STAND MANAGEMENT OBJECTIVES

HIGHER LEVEL AND OTHER PLANS

This Site and Harvest Plan is consistent with:

- The guiding principles of the *Strategic Forest Management Plan for the Champagne and Aishihik Traditional Territory (CATT)*,
- The *CATT Integrated Landscape Plan* which defines the management priorities and guidelines for Timber Harvest Project Planning.
- And the *CATT Regional Timber Harvesting Project Within The Pine Lake and Canyon Landscape Units* which links the above Landscape Level Strategies, Management Priorities and Guidelines to this Stand Level Operational Plan.

STAND-LEVEL OBJECTIVES

Discuss non-timber values that may be affected by the proposed treatment and measures proposed to accommodate these Traditional or First Nations

As per the *CATT ILP Heritage and Cultural Guidelines* (section 3.8). Qualified Champagne and Aishihik personnel must conduct a pre-harvest field assessment.

No potential cultural or heritage resource features were noted within the harvest area during the reconnaissance and cruising phases.

If a previously unidentified cultural or heritage resource is encountered during the harvesting or road building operations, operations will cease to the extent necessary to ensure its protection until an assessment can be carried out.

Wildlife Values

As per the *CATT ILP Forest Ecosystems, Wildlife, and Biological Diversity Guidelines* (section 3.5) appropriate wildlife movement corridors have been maintained at the landscape level focusing on riparian management areas while stand level buffers, reserves and retention have are provided as on block elements to enhance and complement the landscape connectivity. In addition, there are no “Species at Risk” that will be adversely impacted by harvesting on this site. Consultation with CAFN members, and referral with wildlife managers noted the occurrence of wood bison throughout the area. These species are not expected to be adversely impacted by logging activity in this block. Deer occur throughout the area. Forest harvesting may create suitable foraging habitat for deer.

This block is located within the *CATT ILP FRMZ High Wildlife Value Area*. Therefore all harvest blocks must average 25% retention of stand structure with a range of 10-30%. The total amount of retention in this block (Buffers, Reserves and dispersed leave trees) is 29% by volume.

As per the *Best Management Practices For Northern Goshawk Habitat In The Yukon Territory* any large stick nests found were buffered from harvest by a minimum 200m no-harvest zone connected to the outside of the harvest area. In addition, the stands in this block have a habitat suitability rank “nil” due to the dead and dying mature canopy.

This block meets all connectivity requirements outlined in the *Habitat Connectivity Planning Recommendations For Forest harvest Planning In The Champagne And Aishihik Traditional Territory*

Fish Water Values

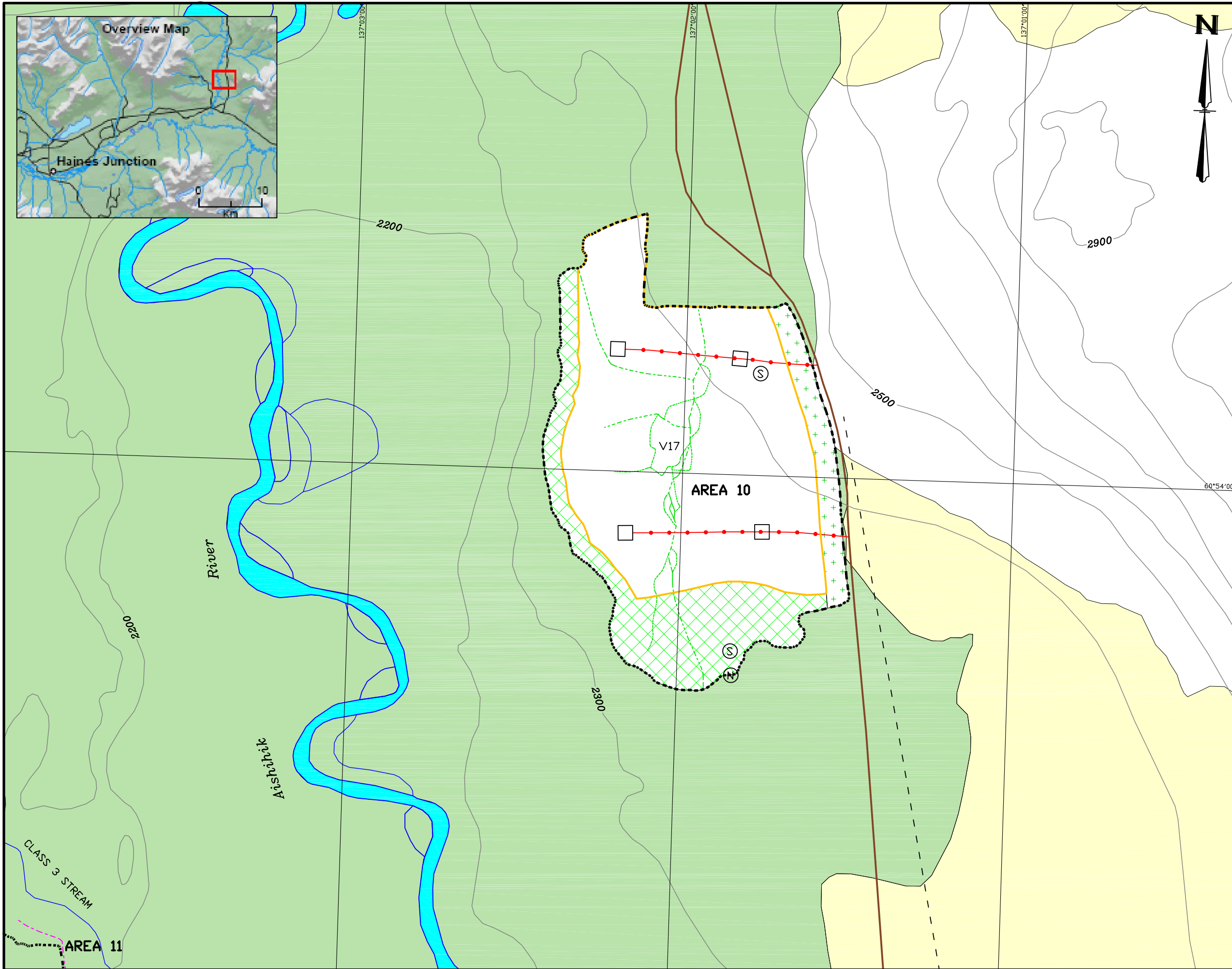
As per the *CATT ILP Watershed and Riparian Management Guidelines* (section 3.6) the cumulative area of this and all other blocks in this landscape unit does not exceed 20% of the watershed area. In addition, the *THPOG* guidelines have been followed for all classified streams in or adjacent to this block (see section 5 *Riparian Management* of this S&HP). All streams encountered were defaulted to fish bearing.

SITE AND HARVEST PLAN

Recr Visual Values					
A minimum 60m reserve has been proposed along the Aishihik Lake Road to minimize the visual impact.					
Other Values					
Other Tenures: The area is used for grazing horses. Trails should be kept free of debris during and after operations.					
Fuel Abatement: This area is located in the <i>CATT ILP Forest Resource Management Zone</i> and <i>Landscape Fuel Abatement Subzone</i> . As such, it meets the management objectives of: <ol style="list-style-type: none"> 1. being a stand with >30% beetle attack. 2. having a size, shape and location that “enhances fuel discontinuity”. 3. has a stand structure that allows the implementation silviculture principles to reduce the fire hazard. 4. being close to the Alaska Highway and the communities of Haines Junction and Canyon. 					
7. SILVICULTURE SYSTEM DESCRIPTION					
STAND NUMBER	SILVICULTURE SYSTEM	SEASON	RATIONALE		
V17	Natural Shelterwood	Winter	Winter harvest is required due to very high soil compaction hazard.		
Dispersed Retention Leave Tree Specs					
For the V17 Type the target for dispersed retention will be to leave all Deciduous trees and all Non-beetle attacked spruce including as much of the advanced regeneration in the understory as possible. The minimum level of understory retention will be at least 50% of the pre-harvest stems per hectare.					
Special Management Zone Leave Tree Specs					
Not Applicable					
8. SOIL CONSERVATION					
ON BLOCK PERMANENT DISTURBANCE CALCULATION TAB					
Disturbance Type (Road/landing)	Identification (Name / Number)	Road Standard	Length (m)	Width (m)	Total Area L x W /10,000 (ha)
N/A	N/A	N/A	N/A	N/A	N/A
Road Area	Landing Area	Total Area	Block Gross Area	Block Net Area	% Disturb. Of Gross Area
N/A	N/A	N/A	N/A	N/A	No permanent roads or landings
Depth of LFH	Hazard Ratings			Permafrost or Frost Heaving	Proposed Harvest Season
	Compaction	Surface Erosion	Displacement		
5cm	Very High	Moderate	Moderate	No permafrost	Winter
Proportion of Temporary Access Within Net Area to be reforested (explain rehabilitation measures)					
The proportion of temporary access within the NAR will not exceed 10%. These roads and landings will be ripped (as needed) have organic debris scattered on top and planted or allowed to regenerate naturally as part of the NAR. Rehabilitation will be completed within three years of harvest.					

SITE AND HARVEST PLAN

Fire Hazard Abatement (explain measures for slash abatement)								
<p>The current fire hazard is high to extreme. Salvage harvesting and subsequent slash reduction will greatly reduce the potential fire hazard on this site.</p> <p>After harvest, excess slash accumulated at the landings (piles) will be burned within two years of harvest. Otherwise, dispersed slash will be left to contribute to Coarse Woody Debris, small fur-bearer habitat and act as a soil carbon and nutrient supply.</p>								
Forest Health (explain measures to reduce current and future risk of forest to disease and insects)								
<p>This area has been severely attacked by spruce beetle (<i>Dendroctonus Rufipennis</i>). The proportion of merchantable stems that are attacked by beetles (Cruise Beetle Codes 5, 6 & 7) is 40%. Harvesting is prescribed to remove these trees and allow for planted and natural regeneration.</p>								
Additional Comments								
9. REFORESTATION AND DESCRIPTION								
SIS #	Stand #	Net Area to Reforest (ha)	Restocking		Target Stocking (SPH)	Assessment Dates Delay to Treat	Regen Surveys	
			Pref Species	Acc Species			Early Stocking	Late Performance
	V17	51.7	Sw	At	1200	H+2	H+5	H+10
Reforestation Plan								
<p>Natural regeneration supplemented with fill planting where necessary.</p> <p>Stand Number V17 may be left for up to two (2) years after harvest to facilitate establishment of natural regeneration. A regeneration survey should be conducted at this time and any areas found to be not satisfactorily restocked will be planted no later than four (4) years after harvest. The survey will also specify other remedial actions if necessary.</p>								
Establishment to Assessment Date Concerns								
<p>No Brushing concerns anticipated.</p>								
Additional Comments								
FMB								
Approval by:				Date:				
Position:				Signature:				
10. ATTACHMENTS								
<p style="text-align: center;">Site and Harvest Plan Map @ 1: <u>10,000</u></p>								



INTEGRATED LANDSCAPE PLAN

TIMBER HARVEST PROJECT

CHAMPAGNE and AISHIHIK
TRADITIONAL TERRITORY
YUKON, CANADA

AREA 10

SITE AND HARVEST PLAN MAP

FMU: Y06
Eco-Region: Ruby Range / Southern Lakes
CATT ILP Zone: Forest Resource Mangement Zone
Sub Zone: Landscape Fuel Abatement
Latitude: 60° 53' 59.8" Longitude: 137° 01' 59.8"
NTS Map Sheet: 115 A
Base Map Information Localized

Area Summary

Area of Interest		73.0	
Landscape Buffers	Area ha	Internal Reserve and Natural NP	Area ha
Wildlife	16.2	Reserve	0.0
Riparian	0.0	Non Timber	0.0
Visual	5.1		
Other	0.0		
Gross Operable Area	51.7	Net Operable Area	51.7

Stand Number	Vegetation Type	Inventory Label	Harvest Season	Area ha
V17	V17	SW10-4A5M	W	51.7
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
Net Area to Reforest				Total 51.7

Timber Type	Net Operable Area (ha)	Net Available Volume (m3/ha)
All (V17)	All (V17)	3,842

Legend

Net Operable Area

Non Forested

White Spruce

1990-1999 Fires

Balsam Poplar

Trembling Aspen

Base Map

Highway

Limited Use Road

Pro Temp Rd(Class 4/5)

Loc Temp Rd(Class 2)

Logging Road

Contour (100ft)

Trail

Cut Line

Watercourses

Wetland

Waterbody

Dry Riverbed/Sand

Scale 1 : 10,000

100 50 0 100 200 300 400 500

INDUSTRIAL FORESTRY SERVICE LTD.
1595 Fifth Avenue
Prince George, B.C.
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PH: (250) 564-4115 FAX: (250) 563-9679

Date Drawn: Feb 21/07

Date of Field Work: Summer 2007

IFS Job #: 070224

Contract #: FMB 07-01

FOREST MANAGEMENT BRANCH

SITE AND HARVEST PLAN

1. LOCATION								
District			Geographic Location Name			Mapsheet		
Kluane			Haines Junction Area			115A		
FMU			Latitude		Longitude		SIS#	
Y06			60° 51' 30.3"		137° 07' 57.9"			
Development Area			Block Number			Air Photo Numbers		
Canyon Landscape Unit			12			N/A		
2. ECOLOGY AND SITE CONDITION								
Eco-Region			Vegetation Type			Soil Type / Soil Texture		
Ruby Range / Southern Lakes			V17			S4-S5/SiL-SiCL		
Elevation (m)	Slope (%)	Aspect	Terrain	Slope Position	Moist Regime	Soil Drainage	LFH Depth (cm)	NDZ
685-755	6	S	Even	Mid	Fresh	Well-Mod.Well	7	Simple Upland (3)
3. BLOCK AREA SUMMARY IN HECTARE								
Area of Interest (ha)	Wildlife Buffers (ha)	Riparian Buffers (ha)	Visual Buffers (ha)	Other Buffers (ha)	Reserve (ha)	Non Timber (ha)	Perm Roads Landings (ha)	Net Area to Reforest (ha)
236.2			35.2	34.3	14.2	5.2		147.3
4. HARVEST STAND DESCRIPTION								
Stand Number	Merch Area (ha)	Species	Crown Closure	Age (years)	Avg. Height (m)	Avg. DBH (cm)	Est. Vol/Ha (m³/ha)	
All (V17)	147.3	Sw10	10%	112	14.7	18.2	94	
5. RIPARIAN MANAGEMENT								
Riparian ID#	Class (Stream Wetland Lake)	Reserve Zone Width (m)	Rationale For Reserve	Mngmt Zone Width (m)	Strategies for Management Zone			
N/A	N/A	N/A	N/A	N/A	N/A			
Riparian Comments :								
1. Reserves and Management Zones are as per the <i>Timber Harvest Planning and Operating Guidebook</i> .								
2. Riparian Features are the basis of the <i>CATT Habitat Connectivity Planning Recommendations</i> .								

SITE AND HARVEST PLAN

6. STAND MANAGEMENT OBJECTIVES

HIGHER LEVEL AND OTHER PLANS

This Site and Harvest Plan is consistent with:

- The guiding principles of the *Strategic Forest Management Plan for the Champagne and Aishihik Traditional Territory (CATT)*,
- The *CATT Integrated Landscape Plan* which defines the management priorities and guidelines for Timber Harvest Project Planning.
- And the *CATT Regional Timber Harvesting Project Within The Pine Lake and Canyon Landscape Units* which links the above Landscape Level Strategies, Management Priorities and Guidelines to this Stand Level Operational Plan.

STAND-LEVEL OBJECTIVES

Discuss non-timber values that may be affected by the proposed treatment and measures proposed to accommodate these Traditional or First Nations

This block is likely of moderate to low significance for CAFN heritage potential; however, consultation with CAFN citizens indicate a possible heritage location near one edge of the block. As per the *CATT ILP Heritage and Cultural Guidelines* (section 3.8), qualified Champagne and Aishihik personnel must conduct a pre-harvest field assessment.

Existing trails in this block are used for hunting rabbits, gopher and grouse and for trapping activity.

No potential cultural or heritage resource features were noted within the harvest area during the reconnaissance and cruising phases.

If a previously unidentified cultural or heritage resource is encountered during the harvesting or road building operations, operations will cease to the extent necessary to ensure its protection until an assessment can be carried out.

Wildlife Values

As per the *CATT ILP Forest Ecosystems, Wildlife, and Biological Diversity Guidelines* (section 3.5) appropriate wildlife movement corridors have been maintained at the landscape level focusing on riparian management areas while stand level buffers, reserves and retention have are provided as on block elements to enhance and complement the landscape connectivity. In addition, there are no “Species at Risk” that will be adversely impacted by harvesting on this site.

This block is located within the *CATT ILP FRMZ High Wildlife Value Area*. Therefore all harvest blocks must average 25% retention of stand structure with a range of 10-30%. The total amount of retention in this block (Buffers, Reserves and dispersed leave trees) is 36% by volume.

A fox/coyote sized den was noted in the southern portion of the block, which has been excluded from the harvest area and included in an expanded visual reserve. Consultation with CAFN citizens indicated the use of this block by deer and moose. Both species are seen frequently crossing the highway adjacent to this block and forest to the south.

This block meets all connectivity requirements outlined in the *Habitat Connectivity Planning Recommendations For Forest harvest Planning In The Champagne And Aishihik Traditional Territory*

Fish Water Values

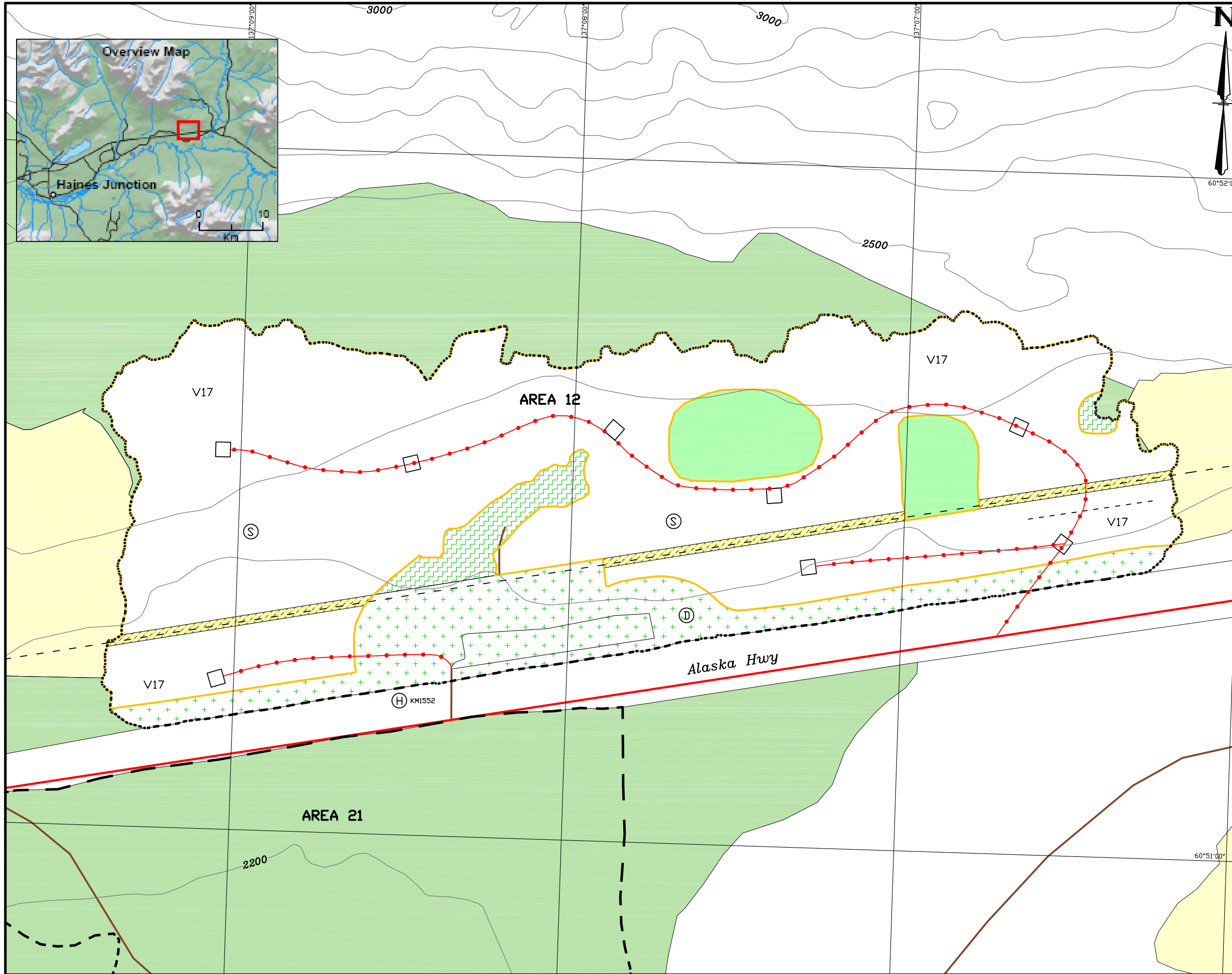
As per the *CATT ILP Watershed and Riparian Management Guidelines* (section 3.6) the cumulative area of this and all other blocks in this landscape unit does not exceed 20% of the watershed area. In addition, the *THPOG* guidelines have been followed for all classified streams in or adjacent to this block (see section 5 *Riparian Management* of this S&HP). All streams encountered were defaulted to fish bearing.

SITE AND HARVEST PLAN

Recr Visual Values					
As per section 3.7 of the CATT ILP, visual concerns adjacent to the Alaska Highway have been addressed by leaving an un-harvested buffer. The minimum width for this area of interest is 60m.					
Other Values					
Fuel Abatement: This area is located in the <i>CATT ILP Forest Resource Management Zone</i> and <i>Landscape Fuel Abatement Subzone</i> . As such, it meets the management objectives of: <ol style="list-style-type: none"> 1. being a stand with >30% beetle attack. 2. having a size, shape and location that “enhances fuel discontinuity”. 3. has a stand structure that allows the implementation silviculture principles to reduce the fire hazard. 4. being close to the Alaska Highway and the communities of Haines Junction and Canyon. 					
7. SILVICULTURE SYSTEM DESCRIPTION					
STAND NUMBER	SILVICULTURE SYSTEM	SEASON	RATIONALE		
V17	Natural Shelterwood	Winter	Winter harvest is required due to very high soil compaction hazard.		
Dispersed Retention Leave Tree Specs					
For the V17 Type the target for dispersed retention will be to leave all Deciduous trees and all Non-beetle attacked spruce including as much of the advanced regeneration in the understory as possible. The minimum level of understory retention will be at least 50% of the pre-harvest stems per hectare.					
Special Management Zone Leave Tree Specs					
Not Applicable					
8. SOIL CONSERVATION					
ON BLOCK PERMANENT DISTURBANCE CALCULATION TAB					
Disturbance Type (Road/landing)	Identification (Name / Number)	Road Standard	Length (m)	Width (m)	Total Area L x W /10,000 (ha)
N/A	N/A	N/A	N/A	N/A	N/A
Road Area	Landing Area	Total Area	Block Gross Area	Block Net Area	% Disturb. Of Gross Area
N/A	N/A	N/A	N/A	N/A	No permanent roads or landings
Depth of LFH	Hazard Ratings			Permafrost or Frost Heaving	Proposed Harvest Season
	Compaction	Surface Erosion	Displacement		
7cm	High to Very High	Moderate to High	Moderate	No permafrost	Winter
Proportion of Temporary Access Within Net Area to be reforested (explain rehabilitation measures)					
The proportion of temporary access within the NAR will not exceed 10%. These roads and landings will be ripped (as needed) have organic debris scattered on top and planted or allowed to regenerate naturally as part of the NAR. Rehabilitation will be completed within three years of harvest.					
Fire Hazard Abatement (explain measures for slash abatement)					
The current fire hazard is high to extreme. Salvage harvesting and subsequent slash reduction will greatly reduce the potential fire hazard on this site.					
After harvest, excess slash accumulated at the landings (piles) will be burned within two years of harvest. Otherwise, dispersed slash will be left to contribute to Coarse Woody Debris, small fur-bearer habitat and act as a soil carbon and nutrient supply.					

SITE AND HARVEST PLAN

Forest Health (explain measures to reduce current and future risk of forest to disease and insects)								
This area has been severely attacked by spruce beetle (<i>Dendroctonus Rufipennis</i>). The proportion of merchantable stems that are attacked by beetles (Cruise Beetle Codes 5, 6 & 7) is 48%. Harvesting is prescribed to remove these trees and allow for planted and natural regeneration.								
Additional Comments								
9. REFORESTATION AND DESCRIPTION								
SIS #	Stand #	Net Area to Reforest (ha)	Restocking		Target Stocking (SPH)	Assessment Dates Delay to Treat	Regen Surveys	
			Pref Species	Acc Species			Early Stocking	Late Performance
	V17		Sw	At	1200	H+2	H+5	H+10
Reforestation Plan								
Natural regeneration supplemented with fill planting where necessary.								
Stand Number V17 may be left for up to two (2) years after harvest to facilitate establishment of natural regeneration. A regeneration survey should be conducted at this time and any areas found to be not satisfactorily restocked will be planted no later than four (4) years after harvest. The survey will also specify other remedial actions if necessary.								
Establishment to Assessment Date Concerns								
No Brushing concerns anticipated.								
Additional Comments								
FMB								
Approval by:				Date:				
Position:				Signature:				
10. ATTACHMENTS								
Site and Harvest Plan Map @ 1: 10,000								



INTEGRATED LANDSCAPE PLAN TIMBER HARVEST PROJECT

CHAMPAGNE and AISHIHIK
TRADITIONAL TERRITORY
YUKON, CANADA

AREA 12
SITE AND HARVEST PLAN MAP

FMU: Y06
Eco-Region: Ruby Range / Southern Lakes
CATT ILP Zone: Forest Resource Management Zone
Sub Zone: Landscape Fuel Abatement
Latitude: 60° 51' 30.3" Longitude: 137° 07' 57.9"
NTS Map Sheet: 115 A
Base Map Information Localized

Area Summary			
Area of Interest			236.2
Landscape Buffers	Area ha	Internal Reserve and Natural NP	Area ha
Wildlife	0.0	Reserve	14.2
Riparian	0.0	Non Timber	5.2
Visual	35.2		
Other	34.3		
Gross Operable Area	166.7	Net Operable Area	147.3

Stand Number	Vegetation Type	Inventory Label	Harvest Season	Area ha
V17	V17	SW10-4B4M	W	147.3
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
Net Area to Reforest			Total	147.3

Cruise Information		
Timber Type	Net Operable Area (ha)	Net Available Volume (m3/ha)
All (V17)	All (V17)	13,868

Legend

Net Operable Area

Non Forested

White Spruce

1990-1999 Fires

Balsam Poplar

Trembling Aspen

Base Map

Highway

Limited Use Road

Pro Temp Rd(Class 4/5)

Loc Temp Rd(Class 2)

Logging Road

Contour (100ft)

Trail

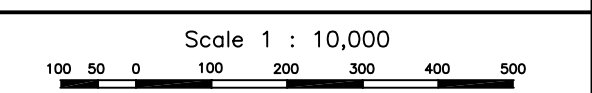
Cut Line

Watercourses

Wetland

Waterbody

Dry Riverbed/Sand



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Date Drawn: Feb 21/07
Date of Field Work: Summer 2007
IFS Job #: 070224
Contract #: FMB 07-01

FOREST MANAGEMENT BRANCH

SITE AND HARVEST PLAN

1. LOCATION								
District			Geographic Location Name				Mapsheet	
Kluane			Haines Junction Area				115A	
FMU			Latitude		Longitude		SIS#	
Y06			60° 51' 32.3"		137° 17' 09.9"			
Development Area			Block Number			Air Photo Numbers		
Pine Lake and Canyon Landscape Unit			13B			N/A		
2. ECOLOGY AND SITE CONDITION								
Eco-Region			Vegetation Type			Soil Type / Soil Texture		
Ruby Range / Southern Lakes			V17			S4/SiL		
Elevation (m)	Slope (%)	Aspect	Terrain	Slope Position	Moist Regime	Soil Drainage	LFH Depth (cm)	NDZ
735-775	6	NW	Rolling	Mid	Fresh	Well	8	Simple Upland (3)
3. BLOCK AREA SUMMARY IN HECTARE								
Area of Interest (ha)	Wildlife Buffers (ha)	Riparian Buffers (ha)	Visual Buffers (ha)	Other Buffers (ha)	Reserve (ha)	Non Timber (ha)	Perm Roads Landings (ha)	Net Area to Reforest (ha)
60.7	11.4			9.8	0.3			39.2
4. HARVEST STAND DESCRIPTION								
Stand Number	Merch Area (ha)	Species	Crown Closure	Age (years)	Avg. Height (m)	Avg. DBH (cm)	Est. Vol/Ha (m³/ha)	
All (V17)	39.2	Sw10	20%	165	17.5	19.6	140	

SITE AND HARVEST PLAN

5. RIPARIAN MANAGEMENT					
Riparian ID#	Class (Stream Wetland Lake)	Reserve Zone Width (m)	Rationale For Reserve	Mngmt Zone Width (m)	Strategies for Management Zone
Un-named	Class 2 Wetland (1-5ha.)	60	Habitat & Connectivity	40	Partial harvest
Un-named	Class 3 Wetland (>5ha.)	60	Habitat & Connectivity	140	Partial harvest
Un-named	NCD	0	Water & Habitat	0	No Harvest
Riparian Comments : <ol style="list-style-type: none"> 1. Reserves and Management Zones are as per the <i>Timber Harvest Planning and Operating Guidebook</i>. 2. Riparian Features are the basis of the <i>CATT Habitat Connectivity Planning Recommendations</i>. 3. For the Class 2 wetland adjacent to the north boundary, the reserve zone and most of the Riparian Management Zone (RMZ) have been excluded from the block. The small portion of the RMZ within the block will be managed as per the rest of the block (i.e. Salvage harvest with understory retention). 4. For the Class 3 wetland adjacent to the southern boundary, the entire Riparian Reserve Zone has been excluded from the block. The remainder of the RMZ within the block will be managed as per the rest of the block (i.e. Salvage harvest with understory retention). 					
6. STAND MANAGEMENT OBJECTIVES					
HIGHER LEVEL AND OTHER PLANS					
<p>This Site and Harvest Plan is consistent with:</p> <ul style="list-style-type: none"> • The guiding principles of the <i>Strategic Forest Management Plan for the Champagne and Aishihik Traditional Territory (CATT)</i>, • The <i>CATT Integrated Landscape Plan</i> which defines the management priorities and guidelines for Timber Harvest Project Planning. • And the <i>CATT Regional Timber Harvesting Project Within The Pine Lake and Canyon Landscape Units</i> which links the above Landscape Level Strategies, Management Priorities and Guidelines to this Stand Level Operational Plan. 					
STAND-LEVEL OBJECTIVES					
Discuss non-timber values that may be affected by the proposed treatment and measures proposed to accommodate these Traditional or First Nations					
<p>As per the <i>CATT ILP Heritage and Cultural Guidelines</i> (section 3.8). Qualified Champagne and Aishihik personnel must conduct a pre-harvest field assessment.</p> <p>No potential cultural or heritage resource features were noted within the harvest area during the reconnaissance and cruising phases.</p> <p>If a previously unidentified cultural or heritage resource is encountered during the harvesting or road building operations, operations will cease to the extent necessary to ensure its protection until an assessment can be carried out.</p>					

SITE AND HARVEST PLAN

Wildlife Values

Consultation with CAFN citizens indicated the presence of important wildlife habitat throughout this block, in particular respect to large game movement in the winter and fall, to and from higher elevation and through wetland complexes in the area (i.e. moose). Lynx, coyote, fox and wolverine have been trapped in this area.

As per the *CATT ILP Forest Ecosystems, Wildlife, and Biological Diversity Guidelines* (section 3.5) appropriate wildlife movement corridors have been maintained at the landscape level focusing on riparian management areas while stand level buffers, reserves and retention have are provided as on block elements to enhance and complement the landscape connectivity. In addition, there are no “Species at Risk” that will be adversely impacted by harvesting on this site.

This block is located within the *CATT ILP FRMZ High Wildlife Value Area*. Therefore all harvest blocks must average 25% retention of stand structure with a range of 10-30%. The total amount of retention in this block (Buffers, Reserves and dispersed leave trees) is 37% by volume.

As per the *Best Management Practices For Northern Goshawk Habitat In The Yukon Territory* any large stick nests found were buffered from harvest by a minimum 200m no-harvest zone connected to the outside of the harvest area. In addition, the stands in this block have a habitat suitability rank “moderate or lower due to the dead and dying mature canopy.

This block meets all connectivity requirements outlined in the *Habitat Connectivity Planning Recommendations For Forest harvest Planning In The Champagne And Aishihik Traditional Territory*

Fish Water Values

As per the *CATT ILP Watershed and Riparian Management Guidelines* (section 3.6) the cumulative area of this and all other blocks in this landscape unit does not exceed 20% of the watershed area. In addition, the *THPOG* guidelines have been followed for all classified streams in or adjacent to this block (see section 5 *Riparian Management* of this S&HP). All streams encountered were defaulted to fish bearing.

Recr Visual Values

Not Applicable

Other Values

Mineral Claims:

Several claim posts were noted in this block. The posts will be left standing. No other action required as removal of timber facilitates mining activities.

Fuel Abatement:

This area is located in the *CATT ILP Forest Resource Management Zone* and *Landscape Fuel Abatement Subzone*. As such, it meets the management objectives of:

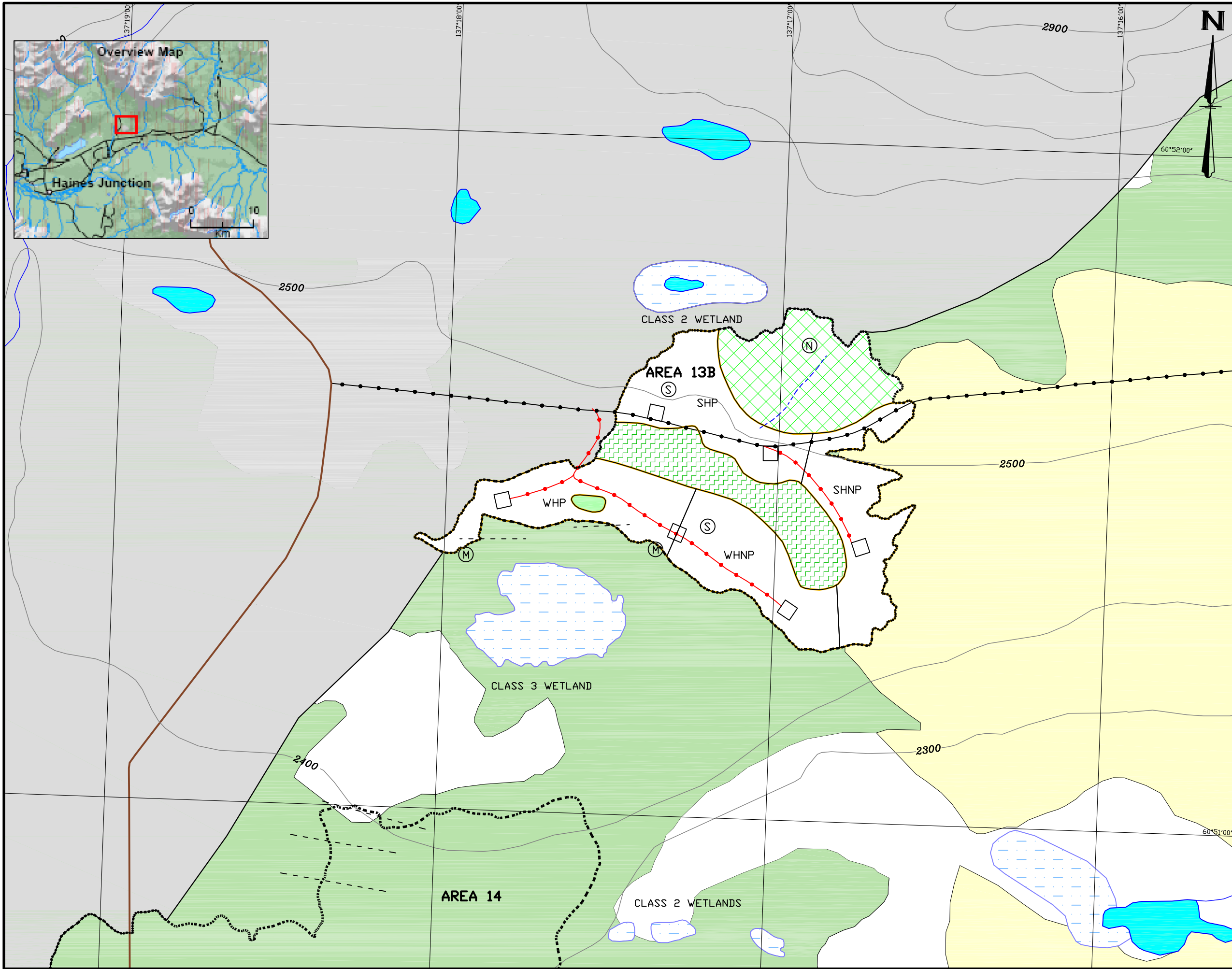
1. being a stand with >30% beetle attack.
2. having a size, shape and location that “enhances fuel discontinuity”.
3. has a stand structure that allows the implementation silviculture principles to reduce the fire hazard.
4. being close to the Alaska Highway and the communities of Haines Junction and Canyon..

SITE AND HARVEST PLAN

7. SILVICULTURE SYSTEM DESCRIPTION					
STAND NUMBER	SILVICULTURE SYSTEM	SEASON	RATIONALE		
WHNP & WHP	Natural Shelterwood	Winter	Refer to note below		
SHNP & SHP	Natural Shelterwood	Summer	Refer to note below.		
Dispersed Retention Leave Tree Specs					
For all types the target for dispersed retention will be to leave all Deciduous trees and all Non-beetle attacked spruce including as much of the advanced regeneration in the understory as possible. The minimum level of understory retention will be at least 50% of the pre-harvest stems per hectare.					
Approximately one half of the area (19.6 ha) will be summer harvested. These treatment units are designated Summer Harvest No Planting (SHNP) and Summer Harvest Planted (SHP). The remaining two treatment units (WHNP & WHP) will winter harvest. As this block is a part of a research trial on summer and winter harvesting, other harvest constraints are specified in the <i>Summer/Winter Harvest Operational Trial</i> document.					
Special Management Zone Leave Tree Specs					
Not Applicable					
8. SOIL CONSERVATION					
ON BLOCK PERMANENT DISTURBANCE CALCULATION TAB					
Disturbance Type (Road/landing)	Identification (Name / Number)	Road Standard	Length (m)	Width (m)	Total Area L x W /10,000 (ha)
N/A	N/A	N/A	N/A	N/A	N/A
Road Area	Landing Area	Total Area	Block Gross Area	Block Net Area	% Disturb. Of Gross Area
N/A	N/A	N/A	N/A	N/A	No permanent roads or landings
Depth of LFH	Hazard Ratings			Permafrost or Frost Heaving	Proposed Harvest Season
	Compaction	Surface Erosion	Displacement		
8cm	High	High	Moderat	No permafrost	Winter & Summer
Proportion of Temporary Access Within Net Area to be reforested (explain rehabilitation measures)					
The proportion of temporary access within the NAR will not exceed 10%. These roads and landings will be ripped (as needed) have organic debris scattered on top and planted or allowed to regenerate naturally as part of the NAR. Rehabilitation will be completed within three years of harvest.					
With regard to the 13 / 13B access road, this road will be constructed to dry weather (class 2) standards to facilitate summer harvest on both areas. However, the operator will be instructed to deck the summer wood at the roadside for hauling during the winter when the winter portion of each area is harvested. This will allow deactivation of this temporary road after harvest to ATV access only for research monitoring purposes.					
Fire Hazard Abatement (explain measures for slash abatement)					
The current fire hazard is high to extreme. Salvage harvesting and subsequent slash reduction will greatly reduce the potential fire hazard on this site.					
After harvest, excess slash accumulated at the landings (piles) will be burned within two years of harvest. Otherwise, dispersed slash will be left to contribute to Coarse Woody Debris, small fur-bearer habitat and act as a soil carbon and nutrient supply.					

SITE AND HARVEST PLAN

Forest Health (explain measures to reduce current and future risk of forest to disease and insects)								
This area has been severely attacked by spruce beetle (<i>Dendroctonus Rufipennis</i>). The proportion of merchantable stems that are attacked by beetles (Cruise Beetle Codes 5, 6 & 7) is 99%. Harvesting is prescribed to remove these trees and allow for planted and natural regeneration.								
Additional Comments								
As the compaction hazard is high, summer harvesting must be carried out in dry weather conditions with low ground pressure (LGP) machinery under close supervision.								
9. REFORESTATION AND DESCRIPTION								
SIS #	Stand #	Net Area to Reforest (ha)	Restocking		Target Stocking (SPH)	Assessment Dates Delay to Treat	Regen Surveys	
			Pref Species	Acc Species			Early Stocking	Late Performance
	WHNP	9.8	As per study	As per study	As per study	N/A	N/A	N/A
	WHP	9.8	Sw	At	1200	H+2	H+5	H+10
	SHNP	9.8	As per study	As per study	As per study	N/A	N/A	N/A
	SHP	9.8	Sw	At	1200	H+2	H+5	H+10
Reforestation Plan								
Natural regeneration supplemented with fill planting where necessary.								
The reforestation plan must be consistent with the criteria in the <i>Summer/Winter Harvest Operational Trial</i> document.								
Establishment to Assessment Date Concerns								
No Brushing concerns anticipated.								
Additional Comments								
FMB								
Approval by:					Date:			
Position:					Signature:			
10. ATTACHMENTS								
Site and Harvest Plan Map @ 1: <u>10,000</u>								



**INTEGRATED LANDSCAPE PLAN
TIMBER HARVEST PROJECT**

CHAMPAGNE and AISHIHIK
TRADITIONAL TERRITORY
YUKON, CANADA

**AREA 13B
SITE AND HARVEST PLAN MAP**

FMU: Y06
Eco-Region: Ruby Range / Southern Lakes
CATT ILP Zone: Forest Resource Mangement Zone
Sub Zone: Landscape Fuel Abatement
Latitude: 60° 51' 32.3" Longitude: 137° 17' 09.9"
NTS Map Sheet: 115 A
Base Map Information Localized

Area Summary

Area of Interest		60.7	
Landscape Buffers	Area ha	Internal Reserve and Natural NP	Area ha
Wildlife	11.4	Reserve	0.3
Riparian	0.0	Non Timber	0.0
Visual	0.0		
Other	9.8		
Gross Operable Area	39.5	Net Operable Area	39.2

Stand Number	Vegetation Type	Inventory Label	Harvest Season	Area ha
SHNP	V17	SW10-5C8M	S	9.8
SHP	V17	SW10-5C8M	S	9.8
WHNP	V17	SW10-5C8M	W	9.8
WHP	V17	SW10-5C8M	W	9.8
Net Area to Reforest			Total	39.2

Cruise Information

Timber Type	Net Operable Area (ha)	Net Available Volume (m3/ha)
All (V17)	All (V17)	5,503

Legend

- Net Operable Area

Non Forested

White Spruce
- 1990-1999 Fires

Balsam Poplar

Trembling Aspen
- Base Map

Highway

Limited Use Road

Pro Temp Rd(Class 4/5)

Loc Temp Rd(Class 2)

Logging Road

Contour (100ft)
- Trail

Cut Line

Watercourses

Wetland

Waterbody

Dry Riverbed/Sand

Scale 1 : 10,000



INDUSTRIAL FORESTRY SERVICE LTD.
1595 Fifth Avenue
Prince George, B.C.
V2L 3L9
PH: (250) 564-4115 FAX: (250) 563-9679
Date Drawn: Feb 21/07
Date of Field Work: Summer 2007
IFS Job #: 070224
Contract #: FMB 07-01

FOREST MANAGEMENT BRANCH

SITE AND HARVEST PLAN

1. LOCATION								
District			Geographic Location Name				Mapsheet	
Kluane			Haines Junction Area				115A	
FMU			Latitude		Longitude		SIS#	
Y06			60° 51' 48.1"		137° 14' 58.8"			
Development Area			Block Number			Air Photo Numbers		
Canyon Landscape Unit			13			N/A		
2. ECOLOGY AND SITE CONDITION								
Eco-Region			Vegetation Type			Soil Type / Soil Texture		
Ruby Range / Southern Lakes			V17			S10/SiCL		
Elevation (m)	Slope (%)	Aspect	Terrain	Slope Position	Moist Regime	Soil Drainage	LFH Depth (cm)	NDZ
745-780	5	SE	Even	Mid	Moist	Mod.Well	14	Simple Upland (3)
3. BLOCK AREA SUMMARY IN HECTARE								
Area of Interest (ha)	Wildlife Buffers (ha)	Riparian Buffers (ha)	Visual Buffers (ha)	Other Buffers (ha)	Reserve (ha)	Non Timber (ha)	Perm Roads Landings (ha)	Net Area to Reforest (ha)
28.6		3.8						24.8
4. HARVEST STAND DESCRIPTION								
Stand Number	Merch Area (ha)	Species	Crown Closure	Age (years)	Avg. Height (m)	Avg. DBH (cm)	Est. Vol/Ha (m³/ha)	
All (V17)	24.8	Sw10	10%	91	20.5	26.2	110	
5. RIPARIAN MANAGEMENT								
Riparian ID#	Class (Stream Wetland Lake)	Reserve Zone Width (m)	Rationale For Reserve	Mngmt Zone Width (m)	Strategies for Management Zone			
Un-named	NCD	0	Water & Habitat	0	No Harvest			
Riparian Comments :								
1. Reserves and Management Zones are as per the <i>Timber Harvest Planning and Operating Guidebook</i> .								
2. Riparian Features are the basis of the <i>CATT Habitat Connectivity Planning Recommendations</i> .								

SITE AND HARVEST PLAN

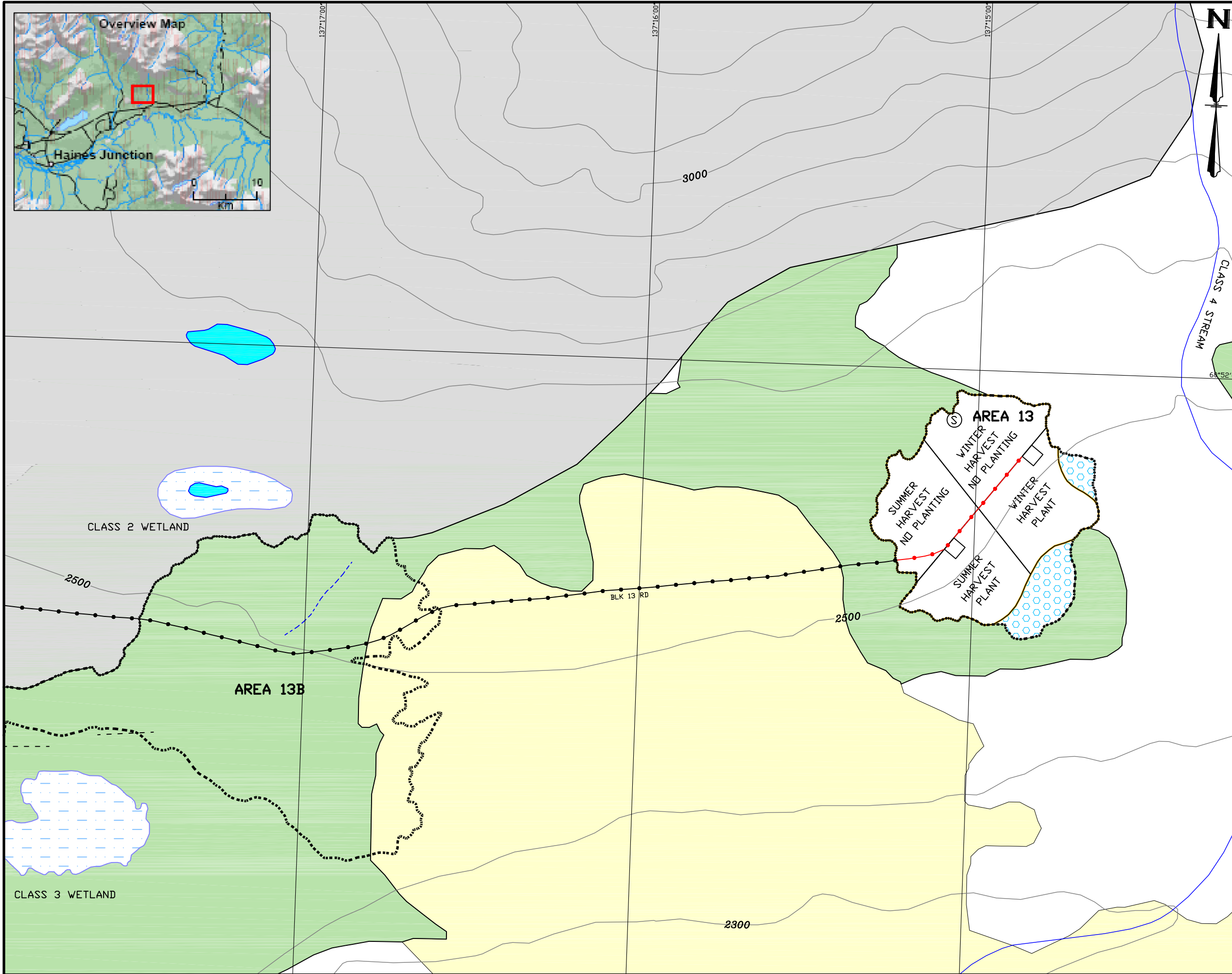
6. STAND MANAGEMENT OBJECTIVES
HIGHER LEVEL AND OTHER PLANS
<p>This Site and Harvest Plan is consistent with:</p> <ul style="list-style-type: none"> • The guiding principles of the <i>Strategic Forest Management Plan for the Champagne and Aishihik Traditional Territory (CATT)</i>, • The <i>CATT Integrated Landscape Plan</i> which defines the management priorities and guidelines for Timber Harvest Project Planning. • And the <i>CATT Regional Timber Harvesting Project Within The Pine Lake and Canyon Landscape Units</i> which links the above Landscape Level Strategies, Management Priorities and Guidelines to this Stand Level Operational Plan.
STAND-LEVEL OBJECTIVES
Discuss non-timber values that may be affected by the proposed treatment and measures proposed to accommodate these Traditional or First Nations
<p>As per the <i>CATT ILP Heritage and Cultural Guidelines</i> (section 3.8). Qualified Champagne and Aishihik personnel must conduct a pre-harvest field assessment.</p> <p>No potential cultural or heritage resource features were noted within the harvest area during the reconnaissance and cruising phases.</p> <p>If a previously unidentified cultural or heritage resource is encountered during the harvesting or road building operations, operations will cease to the extent necessary to ensure its protection until an assessment can be carried out.</p>
Wildlife Values
<p>Consultation with CAFN citizens indicated the presence of important habitat throughout this block, in particular respect to large game movement in the winter and fall, to and from higher elevation and through wetland complexes in the area (i.e. moose). Coyote, lynx, fox and wolverine have been trapped in this area.</p> <p>As per the <i>CATT ILP Forest Ecosystems, Wildlife, and Biological Diversity Guidelines</i> (section 3.5) appropriate wildlife movement corridors have been maintained at the landscape level focusing on riparian management areas while stand level buffers, reserves and retention have are provided as on block elements to enhance and complement the landscape connectivity. In addition, there are no “Species at Risk” that will be adversely impacted by harvesting on this site.</p> <p>This block is located within the <i>CATT ILP FRMZ High Wildlife Value Area</i>. Therefore all harvest blocks must average 25% retention of stand structure with a range of 10-30%. The total amount of retention in this block (Buffers, Reserves and dispersed leave trees) is 13% by volume.</p> <p>This block meets all connectivity requirements outlined in the <i>Habitat Connectivity Planning Recommendations For Forest harvest Planning In The Champagne And Aishihik Traditional Territory</i></p>
Fish Water Values
<p>As per the <i>CATT ILP Watershed and Riparian Management Guidelines</i> (section 3.6) the cumulative area of this and all other blocks in this landscape unit does not exceed 20% of the watershed area. In addition, the <i>THPOG</i> guidelines have been followed for all classified streams in or adjacent to this block (see section 5 <i>Riparian Management</i> of this S&HP). All streams encountered were defaulted to fish bearing.</p>
Recr Visual Values
Not Applicable

SITE AND HARVEST PLAN

Other Values					
Fuel Abatement: This area is located in the <i>CATT ILP Forest Resource Management Zone</i> and <i>Landscape Fuel Abatement Subzone</i> . As such, it meets the management objectives of: <ol style="list-style-type: none"> 1. being a stand with >30% beetle attack. 2. having a size, shape and location that “enhances fuel discontinuity”. 3. has a stand structure that allows the implementation silviculture principles to reduce the fire hazard. 4. being close to the Alaska Highway and the communities of Haines Junction and Canyon. 					
7. SILVICULTURE SYSTEM DESCRIPTION					
STAND NUMBER	SILVICULTURE SYSTEM	SEASON	RATIONALE		
WHNP & WHP	Natural Shelterwood	Winter	Refer to note below		
SHNP & SHP	Natural Shelterwood	Summer	Refer to note below.		
Dispersed Retention Leave Tree Specs					
For all types the target for dispersed retention will be to leave all Deciduous trees and all Non-beetle attacked spruce including as much of the advanced regeneration in the understory as possible. The minimum level of understory retention will be at least 50% of the pre-harvest stems per hectare.					
Approximately one half of the area (12.4 ha) will be summer harvested. These treatment units are designated Summer Harvest No Planting (SHNP) and Summer Harvest Planted (SHP). The remaining two treatment units (WHNP & WHP) will winter harvest. As this block is a part of a research trial on summer and winter harvesting, other harvest constraints are specified in the <i>Summer/Winter Harvest Operational Trial</i> document.					
Special Management Zone Leave Tree Specs					
Not Applicable					
8. SOIL CONSERVATION					
ON BLOCK PERMANENT DISTURBANCE CALCULATION TAB					
Disturbance Type (Road/landing)	Identification (Name / Number)	Road Standard	Length (m)	Width (m)	Total Area L x W /10,000 (ha)
N/A	N/A	N/A	N/A	N/A	N/A
Road Area	Landing Area	Total Area	Block Gross Area	Block Net Area	% Disturb. Of Gross Area
N/A	N/A	N/A	N/A	N/A	No permanent roads or landings
Depth of LFH	Hazard Ratings			Permafrost or Frost Heaving	Proposed Harvest Season
	Compaction	Surface Erosion	Displacement		
14cm	Very High	Moderate	Moderate	No permafrost	Winter & Summer
Proportion of Temporary Access Within Net Area to be reforested (explain rehabilitation measures)					
The proportion of temporary access within the NAR will not exceed 10%. These roads and landings will be ripped (as needed) have organic debris scattered on top and planted or allowed to regenerate naturally as part of the NAR. Rehabilitation will be completed within three years of harvest.					
With regard to the 13 / 13B access road, this road will be constructed to dry weather (class 2) standards to facilitate summer harvest on both areas. However, the operator will be instructed to deck the summer wood at the roadside for hauling during the winter when the winter portion of each area is harvested. This will allow deactivation of this temporary road after harvest to ATV access only for research monitoring purposes.					

SITE AND HARVEST PLAN

Fire Hazard Abatement (explain measures for slash abatement)								
<p>The current fire hazard is high to extreme. Salvage harvesting and subsequent slash reduction will greatly reduce the potential fire hazard on this site.</p> <p>After harvest, excess slash accumulated at the landings (piles) will be burned within two years of harvest. Otherwise, dispersed slash will be left to contribute to Coarse Woody Debris, small fur-bearer habitat and act as a soil carbon and nutrient supply.</p>								
Forest Health (explain measures to reduce current and future risk of forest to disease and insects)								
<p>This area has been severely attacked by spruce beetle (<i>Dendroctonus Rufipennis</i>). The proportion of merchantable stems that are attacked by beetles (Cruise Beetle Codes 5, 6 & 7) is 70%. Harvesting is prescribed to remove these trees and allow for planted and natural regeneration.</p>								
Additional Comments								
<p>As the compaction hazard is very high, summer harvesting must be carried out in dry weather conditions with low ground pressure (LGP) machinery under close supervision.</p>								
9. REFORESTATION AND DESCRIPTION								
SIS #	Stand #	Net Area to Reforest	Restocking		Target Stocking (SPH)	Assessment Dates Delay to Treat	Regen Surveys	
			Pref Species	Acc Species			Early Stocking	Late Performance
	WHNP	6.2	As per study	As per study	As per study	N/A	N/A	N/A
	WHP	6.2	Sw	At	1200	H+2	H+5	H+10
	SHNP	6.2	As per study	As per study	As per study	N/A	N/A	N/A
	SHP	6.2	Sw	At	1200	H+2	H+5	H+10
Reforestation Plan								
<p>Natural regeneration supplemented with fill planting where necessary.</p> <p>The reforestation plan must be consistent with the criteria in the <i>Summer/Winter Harvest Operational Trial</i> document.</p>								
Establishment to Assessment Date Concerns								
<p>No Brushing concerns anticipated.</p>								
Additional Comments								
FMB								
Approval by:					Date:			
Position:					Signature:			
10. ATTACHMENTS								
<p style="text-align: center;">Site and Harvest Plan Map @ 1: <u>10,000</u></p>								



INTEGRATED LANDSCAPE PLAN TIMBER HARVEST PROJECT

CHAMPAGNE and AISHIHIK
TRADITIONAL TERRITORY
YUKON, CANADA

AREA 13 SITE AND HARVEST PLAN MAP

FMU: Y06
Eco-Region: Ruby Range / Southern Lakes
CATT ILP Zone: Forest Resource Management Zone
Sub Zone: Landscape Fuel Abatement
Latitude: 60° 51' 48.1" Longitude: 137° 14' 58.8"
NTS Map Sheet: 115 A
Base Map Information Localized

Area Summary

Area of Interest		28.6
Landscape Buffers	Area ha	Internal Reserve and Natural NP
Wildlife	0.0	Reserve
Riparian	3.8	Non Timber
Visual	0.0	
Other	0.0	
Gross Operable Area	24.8	Net Operable Area
		24.8

Stand Number	Vegetation Type	Inventory Label	Harvest Season	Area ha
SHNP	V17	SW10-6B7M	S	6.2
SHP	V17	SW10-6B7M	S	6.2
WHNP	V17	SW10-6B7M	W	6.2
WHP	V17	SW10-6B7M	W	6.2
Net Area to Reforest			Total	24.8

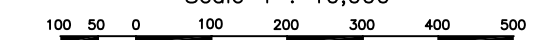
Cruise Information

Timber Type	Net Operable Area (ha)	Net Available Volume (m3/ha)
All (V17)	All (V17)	2,734

Legend

Net Operable Area	1990-1999 Fires
Non Forested	Balsam Poplar
White Spruce	Trembling Aspen
Highway	Trail
Limited Use Road	Cut Line
Pro Temp Rd(Class 4/5)	Watercourses
Loc Temp Rd(Class 2)	Wetland
Logging Road	Waterbody
Contour (100ft)	Dry Riverbed/Sand

Scale 1 : 10,000



INDUSTRIAL FORESTRY SERVICE LTD.
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PH: (250) 564-4115 FAX: (250) 563-9679
Date Drawn: Feb 21/07
Date of Field Work: Summer 2007
IFS Job #: 070224
Contract #: FMB 07-01

FOREST MANAGEMENT BRANCH

SITE AND HARVEST PLAN

1. LOCATION								
District			Geographic Location Name				Mapsheet	
Kluane			Haines Junction Area				115A	
FMU			Latitude		Longitude		SIS#	
Y06			60° 50' 21.2"		137° 18' 25.6"			
Development Area			Block Number			Air Photo Numbers		
Pine Lake and Canyon Landscape Unit			14			N/A		
2. ECOLOGY AND SITE CONDITION								
Eco-Region			Vegetation Type			Soil Type / Soil Texture		
Ruby Range / Southern Lakes			V17			S3-S6/Si-SiS-SiC		
Elevation (m)	Slope (%)	Aspect	Terrain	Slope Position	Moist Regime	Soil Drainage	LFH Depth (cm)	NDZ
685-735	0-5	S	Even	Level	Very Fresh-Very Moist	Well-Imperfect	8	Simple Upland (3)
3. BLOCK AREA SUMMARY IN HECTARE								
Area of Interest (ha)	Wildlife Buffers (ha)	Riparian Buffers (ha)	Visual Buffers (ha)	Other Buffers (ha)	Reserve (ha)	Non Timber (ha)	Perm Roads Landings (ha)	Net Area to Reforest (ha)
210.5	31.9	1.7	11.2		21.7	5.0		139.0
4. HARVEST STAND DESCRIPTION								
Stand Number	Merch Area (ha)	Species	Crown Closure	Age (years)	Avg. Height (m)	Avg. DBH (cm)	Est. Vol/Ha (m³/ha)	
All (V17)	139.0	Sw10	20%	161	18.6	20.4	143	
5. RIPARIAN MANAGEMENT								
Riparian ID#	Class (Stream Wetland Lake)	Reserve Zone Width (m)	Rationale For Reserve	Mngmt Zone Width (m)	Strategies for Management Zone			
Un-named	Class 2 Wetlands (1-5ha.)	60	Habitat & Connectivity	40	No Harvest			
Riparian Comments :								
1. Reserves and Management Zones are as per the <i>Timber Harvest Planning and Operating Guidebook</i> .								
2. Riparian Features are the basis of the <i>CATT Habitat Connectivity Planning Recommendations</i> .								

SITE AND HARVEST PLAN

6. STAND MANAGEMENT OBJECTIVES

HIGHER LEVEL AND OTHER PLANS

This Site and Harvest Plan is consistent with:

- The guiding principles of the *Strategic Forest Management Plan for the Champagne and Aishihik Traditional Territory (CATT)*,
- The *CATT Integrated Landscape Plan* which defines the management priorities and guidelines for Timber Harvest Project Planning.
- And the *CATT Regional Timber Harvesting Project Within The Pine Lake and Canyon Landscape Units* which links the above Landscape Level Strategies, Management Priorities and Guidelines to this Stand Level Operational Plan.

STAND-LEVEL OBJECTIVES

Discuss non-timber values that may be affected by the proposed treatment and measures proposed to accommodate these Traditional or First Nations

As per the *CATT ILP Heritage and Cultural Guidelines* (section 3.8). Qualified Champagne and Aishihik personnel must conduct a pre-harvest field assessment.

Consultation with CAFN citizens indicated considerable past use throughout the seasons, including camps for hunting and trapping. Trapping trails exist in this block and the trapper should be notified prior to harvest to coordinate harvest activities with trapping activities.

No potential cultural or heritage resource features were noted within the harvest area during the reconnaissance and cruising phases.

If a previously unidentified cultural or heritage resource is encountered during the harvesting or road building operations, operations will cease to the extent necessary to ensure its protection until an assessment can be carried out.

Wildlife Values

As per the *CATT ILP Forest Ecosystems, Wildlife, and Biological Diversity Guidelines* (section 3.5) appropriate wildlife movement corridors have been maintained at the landscape level focusing on riparian management areas while stand level buffers, reserves and retention have are provided as on block elements to enhance and complement the landscape connectivity. In addition, there are no “Species at Risk” that will be adversely impacted by harvesting on this site.

This block is located within the *CATT ILP FRMZ High Wildlife Value Area*. Therefore all harvest blocks must average 25% retention of stand structure with a range of 10-30%. The total amount of retention in this block (Buffers, Reserves and dispersed leave trees) is 32% by volume.

As per the *Best Management Practices For Northern Goshawk Habitat In The Yukon Territory* any large stick nests found were buffered from harvest by a minimum 200m no-harvest zone connected to the outside of the harvest area. In addition, the stands in this block have a habitat suitability rank “moderate or lower due to the dead and dying mature canopy.

This block meets all connectivity requirements outlined in the *Habitat Connectivity Planning Recommendations For Forest harvest Planning In The Champagne And Aishihik Traditional Territory*

Fish Water Values

As per the *CATT ILP Watershed and Riparian Management Guidelines* (section 3.6) the cumulative area of this and all other blocks in this landscape unit does not exceed 20% of the watershed area. In addition, the *THPOG* guidelines have been followed for all classified streams in or adjacent to this block (see section 5 *Riparian Management* of this S&HP). All streams encountered were defaulted to fish bearing.

SITE AND HARVEST PLAN

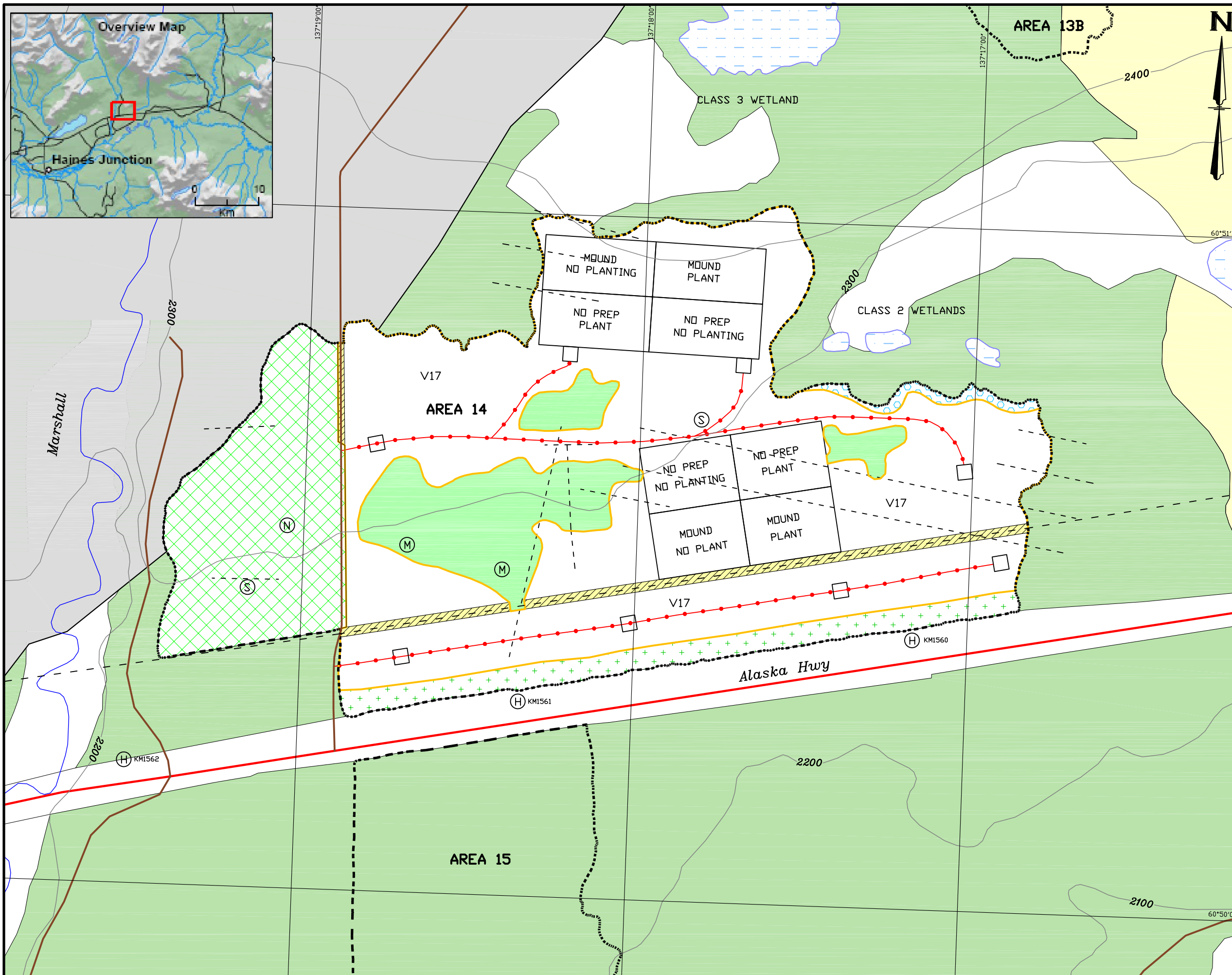
Recr Visual Values			
As per section 3.7 of the CATT ILP, visual concerns adjacent to the Alaska Highway have been addressed by leaving an un-harvested buffer. The minimum width for this area of interest is 60m.			
Other Values			
<p>Mineral Claims: Several claim posts were noted in this block. The posts will be left standing. No other action required as removal of timber facilitates mining activities.</p> <p>Past Forest Harvesting: There has been significant forest harvesting in this block dating back to the 1930's, as evidenced by the numerous stumps within the centre of the block. Consultation with CAFN members identified past harvesting in this block by the Army corps during the construction of the Alaska highway for courduroy sections, camps and bridge timbers.</p> <p>Fuel Abatement: This area is located in the <i>CATT ILP Forest Resource Management Zone</i> and <i>Landscape Fuel Abatement Subzone</i>. As such, it meets the management objectives of:</p> <ol style="list-style-type: none"> 1. being a stand with >30% beetle attack. 2. having a size, shape and location that “enhances fuel discontinuity”. 3. has a stand structure that allows the implementation silviculture principles to reduce the fire hazard. 4. being close to the Alaska Highway and the communities of Haines Junction and Canyon. 			
7. SILVICULTURE SYSTEM DESCRIPTION			
STAND NUMBER	SILVICULTURE SYSTEM	SEASON	RATIONALE
V17	Natural Shelterwood	Winter	Winter harvest is required due to very high soil compaction hazard.
SPS1	Natural Shelterwood	Winter	Refer to note below.
Dispersed Retention Leave Tree Specs			
<p>For the V17 Type the target for dispersed retention will be to leave all Deciduous trees and all Non-beetle attacked spruce including as much of the advanced regeneration in the understory as possible. The minimum level of understory retention will be at least 50% of the pre-harvest stems per hectare.</p> <p>For the SPS1 research trial areas the harvesting constraints are specified in the <i>Site Preparation Operational Trial</i> document. SPS1 represents the mounding site preparation trials.</p>			
Special Management Zone Leave Tree Specs			
Not Applicable			

SITE AND HARVEST PLAN

8. SOIL CONSERVATION					
ON BLOCK PERMANENT DISTURBANCE CALCULATION TAB					
Disturbance Type (Road/landing)	Identification (Name / Number)	Road Standard	Length (m)	Width (m)	Total Area L x W /10,000 (ha)
N/A	N/A	N/A	N/A	N/A	N/A
Road Area	Landing Area	Total Area	Block Gross Area	Block Net Area	% Disturb. Of Gross Area
N/A	N/A	N/A	N/A	N/A	No permanent roads or landings
Depth of LFH	Hazard Ratings			Permafrost or Frost Heaving	Proposed Harvest Season
	Compaction	Surface Erosion	Displacement		
8cm	High to Very High	Moderate to High	Moderate	No permafrost	Winter
Proportion of Temporary Access Within Net Area to be reforested (explain rehabilitation measures)					
The proportion of temporary access within the NAR will not exceed 10%. These roads and landings will be ripped (as needed) have organic debris scattered on top and planted or allowed to regenerate naturally as part of the NAR. Rehabilitation will be completed within three years of harvest.					
Fire Hazard Abatement (explain measures for slash abatement)					
The current fire hazard is high to extreme. Salvage harvesting and subsequent slash reduction will greatly reduce the potential fire hazard on this site.					
After harvest, excess slash accumulated at the landings (piles) will be burned within two years of harvest. Otherwise, dispersed slash will be left to contribute to Coarse Woody Debris, small fur-bearer habitat and act as a soil carbon and nutrient supply.					
Forest Health (explain measures to reduce current and future risk of forest to disease and insects)					
This area has been severely attacked by spruce beetle (<i>Dendroctonus Rufipennis</i>). The proportion of merchantable stems that are attacked by beetles (Cruise Beetle Codes 5, 6 & 7) is 91%. Harvesting is prescribed to remove these trees and allow for planted and natural regeneration.					
One large patch of root rot (greater than one hectare) was observed within the harvest block. Silvicultural strategies should consider the presence of this root rot fungus (likely <i>Innonotus tomentosus</i>).					
Additional Comments					

SITE AND HARVEST PLAN

9. REFORESTATION AND DESCRIPTION								
SIS #	Stand #	Net Area to Reforest (ha)	Restocking		Target Stocking (SPH)	Assessment Dates Delay to Treat	Regen Surveys	
			Pref Species	Acc Species			Early Stocking	Late Performance
	SPS1	36.0	As per study	As per study	As per study	N/A	N/A	N/A
Reforestation Plan Natural regeneration supplemented with fill planting where necessary. Stand Number V17 may be left for up to two (2) years after harvest to facilitate establishment of natural regeneration. A regeneration survey should be conducted at this time and any areas found to be not satisfactorily restocked will be planted no later than four (4) years after harvest. The survey will also specify other remedial actions if necessary. For type SPS1 reforestation plan must be consistent with the criteria in the <i>Site Preparation Operational Trial</i> document.								
Establishment to Assessment Date Concerns No Brushing concerns anticipated.								
Additional Comments 								
FMB								
Approval by:				Date:				
Position:				Signature:				
10. ATTACHMENTS Site and Harvest Plan Map @ 1: <u>10,000</u>								



INTEGRATED LANDSCAPE PLAN TIMBER HARVEST PROJECT

CHAMPAGNE and AISHIHIK
TRADITIONAL TERRITORY
YUKON, CANADA

AREA 14
SITE AND HARVEST PLAN MAP

FMU: Y06
Eco-Region: Ruby Range / Southern Lakes
CATT ILP Zone: Forest Resource Mangement Zone
Sub Zone: Landscape Fuel Abatement
Latitude: 60° 50' 21.2" Longitude: 137° 18' 25.6"
NTS Map Sheet: 115 A
Base Map Information Localized

Area Summary			
Area of Interest			210.5
Landscape Buffers	Area ha	Internal Reserve and Natural NP	Area ha
Wildlife	31.9	Reserve	21.7
Riparian	1.7	Non Timber	5.0
Visual	11.2		
Other	0.0		
Gross Operable Area	165.7	Net Operable Area	139.0

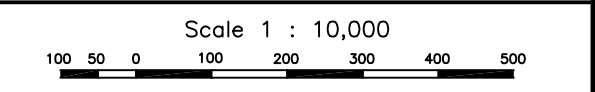
Stand Number	Vegetation Type	Inventory Label	Harvest Season	Area ha
V17	V17	SW10-5B5M	W	103.0
SPS1	V17	SW10-5B5M	W	36.0
-	-	-	-	-
-	-	-	-	-
Net Area to Reforest			Total	139.0

Cruise Information		
Timber Type	Net Operable Area (ha)	Net Available Volume (m3/ha)
All (V17)	All (V17)	19,813

Legend

Net Operable Area (yellow outline)
Non Forested (white)
White Spruce (green)
1990-1999 Fires (grey)
Balsam Poplar (orange)
Trembling Aspen (yellow)

Base Map
Highway (red line)
Limited Use Road (brown line)
Pro Temp Rd(Class 4/5) (red line with dots)
Loc Temp Rd(Class 2) (black line with dots)
Logging Road (black line)
Contour (100ft) (grey line)
Trail (red line with dots)
Cut Line (brown line)
Watercourses (blue line with dots)
Wetland (blue line with dots)
Waterbody (blue line)
Dry Riverbed/Sand (grey line)



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Date Drawn: Feb 21/07
Date of Field Work: Summer 2007
IFS Job #: 070224
Contract #: FMB 07-01

FOREST MANAGEMENT BRANCH

SITE AND HARVEST PLAN

1. LOCATION								
District			Geographic Location Name			Mapsheet		
Kluane			Haines Junction Area			115A		
FMU			Latitude		Longitude		SIS#	
Y06			60° 49' 41.6"		137° 18' 41.0"			
Development Area			Block Number			Air Photo Numbers		
Pine Lake and Canyon Landscape Unit			15			N/A		
2. ECOLOGY AND SITE CONDITION								
Eco-Region			Vegetation Type			Soil Type / Soil Texture		
Ruby Range / Southern Lakes			V17			S5/CL-SiCL		
Elevation (m)	Slope (%)	Aspect	Terrain	Slope Position	Moist Regime	Soil Drainage	LFH Depth (cm)	NDZ
645-670	2	S	Even	Level	Fresh	Well-Mod.Well	8	Simple Upland (3)
3. BLOCK AREA SUMMARY IN HECTARE								
Area of Interest (ha)	Wildlife Buffers (ha)	Riparian Buffers (ha)	Visual Buffers (ha)	Other Buffers (ha)	Reserve (ha)	Non Timber (ha)	Perm Roads Landings (ha)	Net Area to Reforest (ha)
148.8	24.9		6.5	18.6				98.8
4. HARVEST STAND DESCRIPTION								
Stand Number	Merch Area (ha)	Species	Crown Closure	Age (years)	Avg. Height (m)	Avg. DBH (cm)	Est. Vol/Ha (m³/ha)	
All (V17)	98.8	Sw10	15%	137	18.5	20.9	146	
5. RIPARIAN MANAGEMENT								
Riparian ID#	Class (Stream Wetland Lake)	Reserve Zone Width (m)	Rationale For Reserve	Mngmt Zone Width (m)	Strategies for Management Zone			
N/A	N/A	N/A	N/A	N/A	N/A			
Riparian Comments :								
1. Reserves and Management Zones are as per the <i>Timber Harvest Planning and Operating Guidebook</i> .								
2. Riparian Features are the basis of the <i>CATT Habitat Connectivity Planning Recommendations</i> .								

SITE AND HARVEST PLAN

6. STAND MANAGEMENT OBJECTIVES

HIGHER LEVEL AND OTHER PLANS

This Site and Harvest Plan is consistent with:

- The guiding principles of the *Strategic Forest Management Plan for the Champagne and Aishihik Traditional Territory (CATT)*,
- The *CATT Integrated Landscape Plan* which defines the management priorities and guidelines for Timber Harvest Project Planning.
- And the *CATT Regional Timber Harvesting Project Within The Pine Lake and Canyon Landscape Units* which links the above Landscape Level Strategies, Management Priorities and Guidelines to this Stand Level Operational Plan.

STAND-LEVEL OBJECTIVES

**Discuss non-timber values that may be affected by the proposed treatment and measures proposed to accommodate these
Traditional or First Nations**

Consultation with CAFN citizens identified the potential for heritage values in this area; especially along the western and southern edges of this block. As per the *CATT ILP Heritage and Cultural Guidelines* (section 3.8), qualified Champagne and Aishihik personnel must conduct a pre-harvest field assessment.

No potential cultural or heritage resource features were noted within the harvest area during the reconnaissance and cruising phases.

If a previously unidentified cultural or heritage resource is encountered during the harvesting or road building operations, operations will cease to the extent necessary to ensure its protection until an assessment can be carried out.

Wildlife Values

Consultation with CAFN citizens indicated important wildlife habitat in and surrounding this block, including wildlife corridors along the western and southern boundaries. This area has been trapped for fox, coyote, lynx and wolverine.

As per the *CATT ILP Forest Ecosystems, Wildlife, and Biological Diversity Guidelines* (section 3.5) appropriate wildlife movement corridors have been maintained at the landscape level focusing on riparian management areas while stand level buffers, reserves and retention have are provided as on block elements to enhance and complement the landscape connectivity. In addition, there are no “Species at Risk” that will be adversely impacted by harvesting on this site.

This block is located within the *CATT ILP FRMZ High Wildlife Value Area*. Therefore all harvest blocks must average 25% retention of stand structure with a range of 10-30%. The total amount of retention in this block (Buffers, Reserves and dispersed leave trees) is 35% by volume.

As per the *Best Management Practices For Northern Goshawk Habitat In The Yukon Territory* any large stick nests found were buffered from harvest by a minimum 200m no-harvest zone connected to the outside of the harvest area. In addition, the stands in this block have a habitat suitability rank “low” due to the dead and dying mature canopy.

This block meets all connectivity requirements outlined in the *Habitat Connectivity Planning Recommendations For Forest harvest Planning In The Champagne And Aishihik Traditional Territory*

Fish Water Values

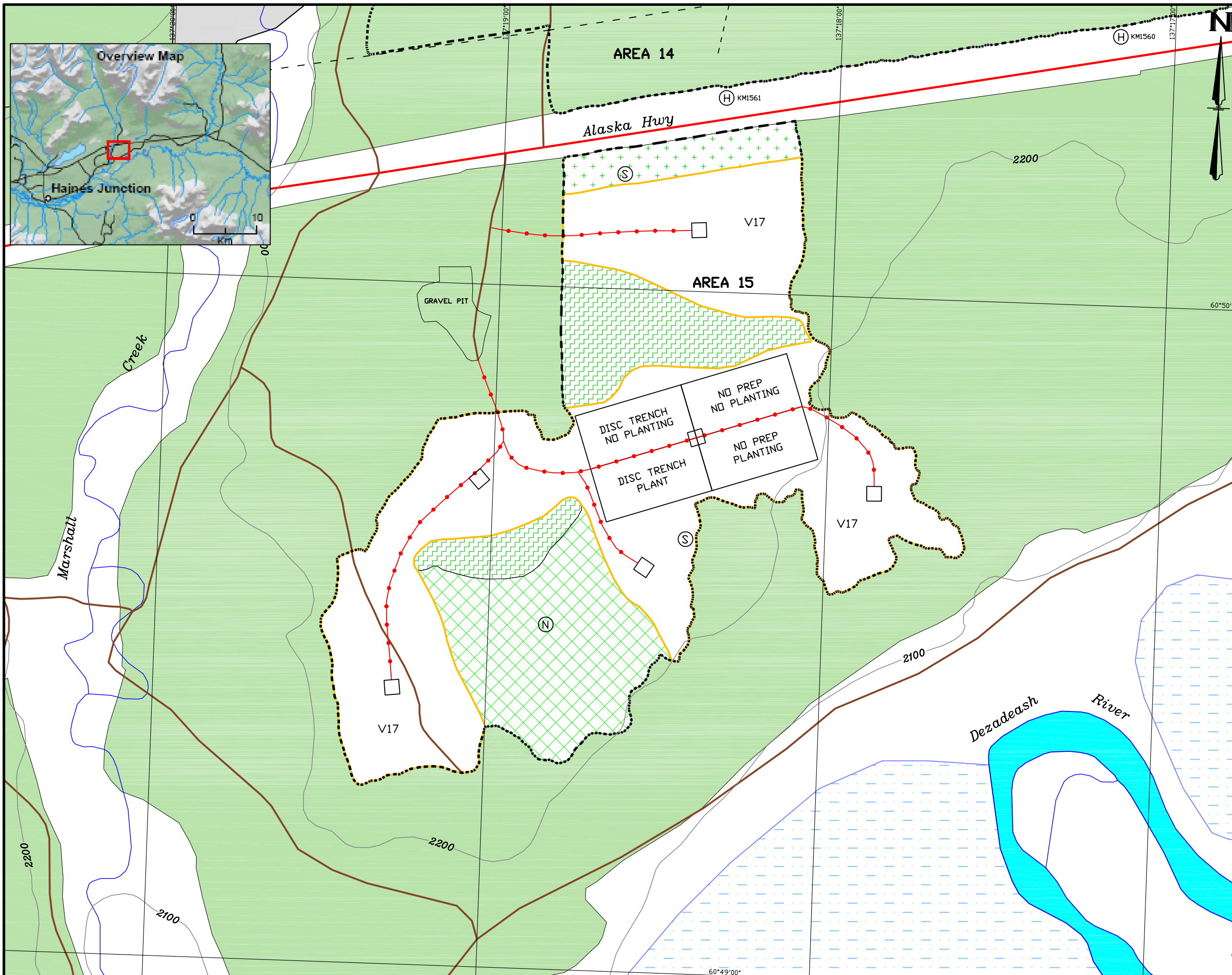
As per the *CATT ILP Watershed and Riparian Management Guidelines* (section 3.6) the cumulative area of this and all other blocks in this landscape unit does not exceed 20% of the watershed area. In addition, the *THPOG* guidelines have been followed for all classified streams in or adjacent to this block (see section 5 *Riparian Management* of this S&HP). All streams encountered were defaulted to fish bearing.

SITE AND HARVEST PLAN

Recr Visual Values					
As per section 3.7 of the CATT ILP, visual concerns adjacent to the Alaska Highway have been addressed by leaving an un-harvested buffer. The minimum width for this area of interest is 100m.					
Other Values					
Fuel Abatement: This area is located in the <i>CATT ILP Forest Resource Management Zone</i> and <i>Landscape Fuel Abatement Subzone</i> . As such, it meets the management objectives of: <ol style="list-style-type: none"> 1. being a stand with >30% beetle attack. 2. having a size, shape and location that “enhances fuel discontinuity”. 3. has a stand structure that allows the implementation silviculture principles to reduce the fire hazard. 4. being close to the Alaska Highway and the communities of Haines Junction and Canyon. 					
7. SILVICULTURE SYSTEM DESCRIPTION					
STAND NUMBER	SILVICULTURE SYSTEM	SEASON	RATIONALE		
V17	Natural Shelterwood	Winter	Winter harvest is required due to very high soil compaction hazard.		
SPS2	Natural Shelterwood	Winter	Refer to note below.		
Dispersed Retention Leave Tree Specs					
For the V17 Type the target for dispersed retention will be to leave all Deciduous trees and all Non-beetle attacked spruce including as much of the advanced regeneration in the understory as possible. The minimum level of understory retention will be at least 50% of the pre-harvest stems per hectare.					
For the SPS2 research trial areas the harvesting constraints are specified in the <i>Site Preparation Operational Trial</i> document. SPS2 represents the disc trenching site preparation trials.					
Special Management Zone Leave Tree Specs					
Not Applicable					
8. SOIL CONSERVATION					
ON BLOCK PERMANENT DISTURBANCE CALCULATION TAB					
Disturbance Type (Road/landing)	Identification (Name / Number)	Road Standard	Length (m)	Width (m)	Total Area L x W /10,000 (ha)
N/A	N/A	N/A	N/A	N/A	N/A
Road Area	Landing Area	Total Area	Block Gross Area	Block Net Area	% Disturb. Of Gross Area
N/A	N/A	N/A	N/A	N/A	No permanent roads or landings
Depth of LFH	Hazard Ratings			Permafrost or Frost Heaving	Proposed Harvest Season
	Compaction	Surface Erosion	Displacement		
8cm	Very High	Moderate	Low to Moderate	No permafrost	Winter
Proportion of Temporary Access Within Net Area to be reforested (explain rehabilitation measures)					
The proportion of temporary access within the NAR will not exceed 10%. These roads and landings will be ripped (as needed) have organic debris scattered on top and planted or allowed to regenerate naturally as part of the NAR. Rehabilitation will be completed within three years of harvest.					

SITE AND HARVEST PLAN

Fire Hazard Abatement (explain measures for slash abatement)								
<p>The current fire hazard is high to extreme. Salvage harvesting and subsequent slash reduction will greatly reduce the potential fire hazard on this site.</p> <p>After harvest, excess slash accumulated at the landings (piles) will be burned within two years of harvest. Otherwise, dispersed slash will be left to contribute to Coarse Woody Debris, small fur-bearer habitat and act as a soil carbon and nutrient supply.</p>								
Forest Health (explain measures to reduce current and future risk of forest to disease and insects)								
<p>This area has been severely attacked by spruce beetle (<i>Dendroctonus Rufipennis</i>). The proportion of merchantable stems that are attacked by beetles (Cruise Beetle Codes 5, 6 & 7) is 77%. Harvesting is prescribed to remove these trees and allow for planted and natural regeneration.</p>								
Additional Comments								
9. REFORESTATION AND DESCRIPTION								
SIS #	Stand #	Net Area to Reforest	Restocking		Target Stocking (SPH)	Assessment Dates Delay to Treat	Regen Surveys	
			Pref Species	Acc Species			Early Stocking	Late Performance
	V17	80.8	Sw	At	1200	H+2	H+5	H+10
	SPS2	18.0	As per study	As per study	As per study	N/A	N/A	N/A
Reforestation Plan								
<p>Natural regeneration supplemented with fill planting where necessary.</p> <p>Stand Number V17 may be left for up to two (2) years after harvest to facilitate establishment of natural regeneration. A regeneration survey should be conducted at this time and any areas found to be not satisfactorily restocked will be planted no later than four (4) years after harvest. The survey will also specify other remedial actions if necessary.</p> <p>For type SPS2 reforestation plan must be consistent with the criteria in the <i>Site Preparation Operational Trial</i> document.</p>								
Establishment to Assessment Date Concerns								
<p>No Brushing concerns anticipated.</p>								
Additional Comments								
FMB								
Approval by:						Date:		
Position:						Signature:		
10. ATTACHMENTS								
<p>Site and Harvest Plan Map @ 1: 10,000</p>								



INTEGRATED LANDSCAPE PLAN

TIMBER HARVEST PROJECT

CHAMPAGNE and AISHIHIK
TRADITIONAL TERRITORY
YUKON, CANADA

AREA 15

SITE AND HARVEST PLAN MAP

FMU: Y06
Eco-Region: Ruby Range / Southern Lakes
CATT ILP Zone: Forest Resource Mangement Zone
Sub Zone: Landscape Fuel Abatement
Latitude: 60° 49' 41.6" Longitude: 137° 18' 41.0"
NTS Map Sheet: 115 A
Base Map Information Localized

Area Summary

Area of Interest		148.8	
Landscape Buffers	Area ha	Internal Reserve and Natural NP	Area ha
Wildlife	24.9	Reserve	0.0
Riparian	0.0	Non Timber	0.0
Visual	6.5		
Other	18.6		
Gross Operable Area	98.8	Net Operable Area	98.8

Stand Number	Vegetation Type	Inventory Label	Harvest Season	Area ha
V17	V17	SW10-5A6G	W	80.8
SPS2	V17	SW10-5A6G	W	18.0
-	-	-	-	-
-	-	-	-	-
Net Area to Reforest				Total 98.8

Timber Type	Net Operable Area (ha)	Net Available Volume (m3/ha)
All (V17)	All (V17)	14,376

Legend

Net Operable Area

Non Forested

White Spruce

1990-1999 Fires

Balsam Poplar

Trembling Aspen

Highway

Limited Use Road

Pro Temp Rd(Class 4/5)

Loc Temp Rd(Class 2)

Logging Road

Contour (100ft)

Trail

Cut Line

Watercourses

Wetland

Waterbody

Dry Riverbed/Sand

Scale 1 : 10,000

100 50 0 100 200 300 400 500

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Date of Field Work: Summer 2007

IFS Job #: 070224

Contract #: FMB 07-01

FOREST MANAGEMENT BRANCH

SITE AND HARVEST PLAN

1. LOCATION								
District			Geographic Location Name				Mapsheet	
Kluane			Haines Junction Area				115A	
FMU			Latitude		Longitude		SIS#	
Y06			60° 47' 06.2"		137° 25' 31.4"			
Development Area			Block Number			Air Photo Numbers		
Pine Lake Landscape Unit			16			N/A		
2. ECOLOGY AND SITE CONDITION								
Eco-Region			Vegetation Type			Soil Type / Soil Texture		
Ruby Range / Southern Lakes			V17			S10/SiC-C		
Elevation (m)	Slope (%)	Aspect	Terrain	Slope Position	Moist Regime	Soil Drainage	LFH Depth (cm)	NDZ
605-665	2	SE	Even	Level	Moist	Mod.Well-Imperfect	9	Simple Upland (3)
3. BLOCK AREA SUMMARY IN HECTARE								
Area of Interest (ha)	Wildlife Buffers (ha)	Riparian Buffers (ha)	Visual Buffers (ha)	Other Buffers (ha)	Reserve (ha)	Non Timber (ha)	Perm Roads Landings (ha)	Net Area to Reforest (ha)
298.9		17.5		37.0	19.0			225.4
4. HARVEST STAND DESCRIPTION								
Stand Number	Merch Area (ha)	Species	Crown Closure	Age (years)	Avg. Height (m)	Avg. DBH (cm)	Est. Vol/Ha (m³/ha)	
All (V17)	225.4	Sw10	25%	179	19.0	21.1	177	
5. RIPARIAN MANAGEMENT								
Riparian ID#	Class (Stream Wetland Lake)	Reserve Zone Width (m)	Rationale For Reserve	Mngmt Zone Width (m)	Strategies for Management Zone			
Un-named	Class 2 Wetland (1-5ha.)	60	Habitat & Connectivity	40	No Harvest			
Riparian Comments :								
1. Reserves and Management Zones are as per the <i>Timber Harvest Planning and Operating Guidebook</i> .								
2. Riparian Features are the basis of the <i>CATT Habitat Connectivity Planning Recommendations</i> .								

SITE AND HARVEST PLAN

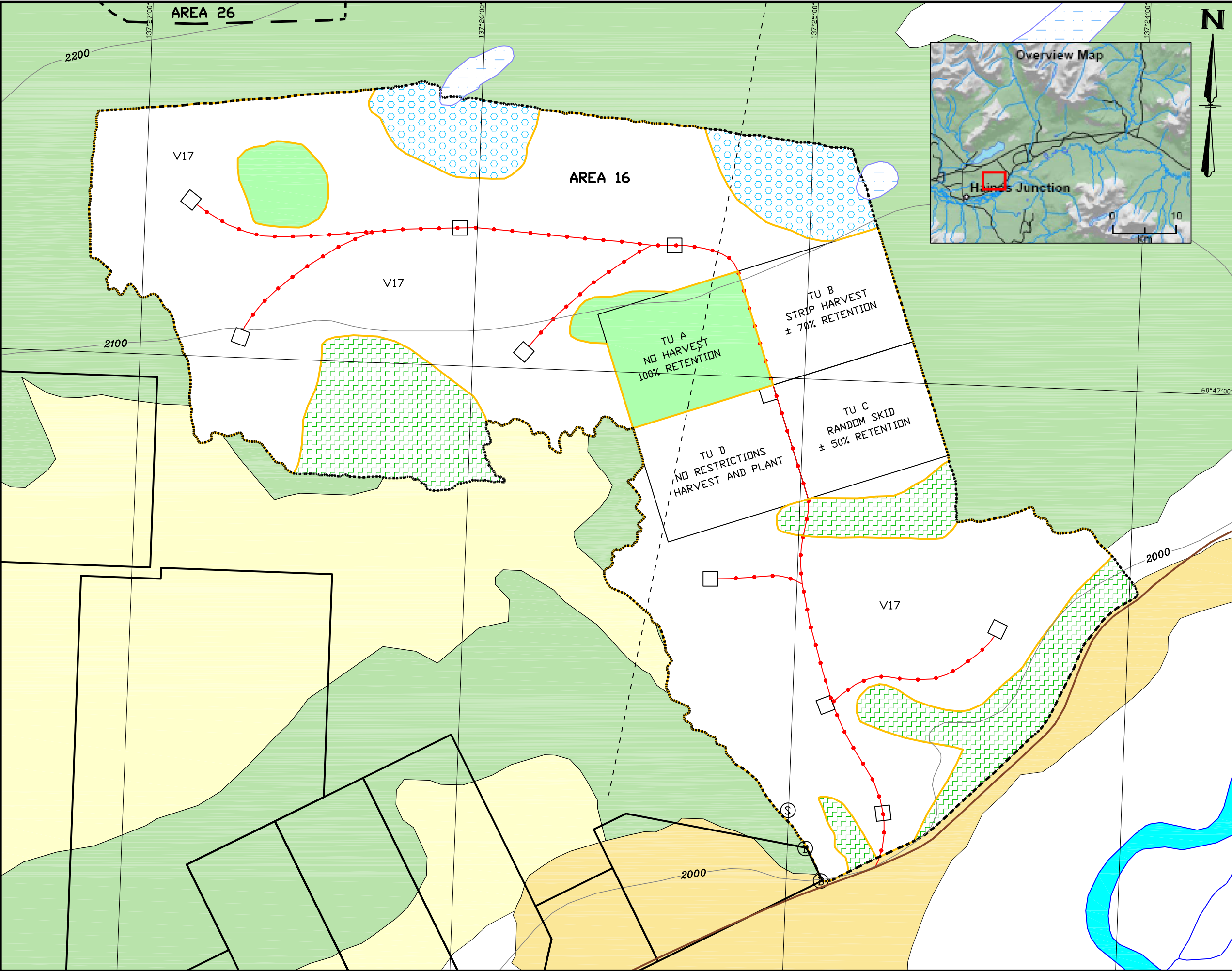
6. STAND MANAGEMENT OBJECTIVES
HIGHER LEVEL AND OTHER PLANS
<p>This Site and Harvest Plan is consistent with:</p> <ul style="list-style-type: none"> • The guiding principles of the <i>Strategic Forest Management Plan for the Champagne and Aishihik Traditional Territory (CATT)</i>, • The <i>CATT Integrated Landscape Plan</i> which defines the management priorities and guidelines for Timber Harvest Project Planning. • And the <i>CATT Regional Timber Harvesting Project Within The Pine Lake and Canyon Landscape Units</i> which links the above Landscape Level Strategies, Management Priorities and Guidelines to this Stand Level Operational Plan.
STAND-LEVEL OBJECTIVES
<p>Discuss non-timber values that may be affected by the proposed treatment and measures proposed to accommodate these Traditional or First Nations</p> <p>Consultation with CAFN members indicated the southern boundary of this block is frequently used by citizens as a place for teaching young hunting skills, with reference to small game (grouse, rabbits) as well as learning larger game hunting such as moose. AS such, it is desired that forest cover is maintained along the Marshall Creek road (suggest a 50 metre buffer). There is also potential in these areas for heritage features. As per the <i>CATT ILP Heritage and Cultural Guidelines</i> (section 3.8). Qualified Champagne and Aishihik personnel must conduct a pre-harvest field assessment.</p> <p>No potential cultural or heritage resource features were noted within the harvest area during the reconnaissance and cruising phases.</p> <p>If a previously unidentified cultural or heritage resource is encountered during the harvesting or road building operations, operations will cease to the extent necessary to ensure its protection until an assessment can be carried out.</p>
Wildlife Values
<p>Consultation with CAFN citizens and referral with wildlife managers indicated the area as important for overland wildlife movement (dispersed rather than as a corridor) from Dezadeash River lowlands to Pine Lake. Lynx, coyote, fox and bear are known to occur in this block.</p> <p>As per the <i>CATT ILP Forest Ecosystems, Wildlife, and Biological Diversity Guidelines</i> (section 3.5) appropriate wildlife movement corridors have been maintained at the landscape level focusing on riparian management areas while stand level buffers, reserves and retention have are provided as on block elements to enhance and complement the landscape connectivity. In addition, there are no “Species at Risk” that will be adversely impacted by harvesting on this site.</p> <p>This block is located within the <i>CATT ILP FRMZ High Wildlife Value Area</i>. Therefore all harvest blocks must average 25% retention of stand structure with a range of 10-30%. The total amount of retention in this block (Buffers, Reserves and dispersed leave trees) is 25% by volume.</p> <p>This block meets all connectivity requirements outlined in the <i>Habitat Connectivity Planning Recommendations For Forest harvest Planning In The Champagne And Aishihik Traditional Territory</i></p>
Fish Water Values
<p>As per the <i>CATT ILP Watershed and Riparian Management Guidelines</i> (section 3.6) the cumulative area of this and all other blocks in this landscape unit does not exceed 20% of the watershed area. In addition, the <i>THPOG</i> guidelines have been followed for all classified streams in or adjacent to this block (see section 5 <i>Riparian Management</i> of this S&HP). All streams encountered were defaulted to fish bearing.</p>
Recr Visual Values
Not Applicable

SITE AND HARVEST PLAN

Other Values					
Fuel Abatement: This area is located in the <i>CATT ILP Forest Resource Management Zone</i> and <i>Landscape Fuel Abatement Subzone</i> . As such, it meets the management objectives of: <ol style="list-style-type: none"> 1. being a stand with >30% beetle attack. 2. having a size, shape and location that “enhances fuel discontinuity”. 3. has a stand structure that allows the implementation silviculture principles to reduce the fire hazard. 4. being close to the Alaska Highway and the communities of Haines Junction and Canyon. 					
Trapline: This area falls within the Haines Junction community trapline area.					
7. SILVICULTURE SYSTEM DESCRIPTION					
STAND NUMBER	SILVICULTURE SYSTEM		SEASON	RATIONALE	
V17	Natural Shelterwood		Winter	Winter harvest is required due to very high soil compaction hazard.	
URS	Refer to note below.		Winter	Refer to note below.	
Dispersed Retention Leave Tree Specs					
For the V17 Type the target for dispersed retention will be to leave all Deciduous trees and all Non-beetle attacked spruce including as much of the advanced regeneration in the understory as possible. The minimum level of understory retention will be at least 50% of the pre-harvest stems per hectare.					
For the URS research trial areas (Treatment Units A, B, C and D) the harvesting constraints are specified in the <i>Understory Retention Operational Trial</i> document.					
Special Management Zone Leave Tree Specs					
Not Applicable					
8. SOIL CONSERVATION					
ON BLOCK PERMANENT DISTURBANCE CALCULATION TAB					
Disturbance Type (Road/landing)	Identification (Name / Number)	Road Standard	Length (m)	Width (m)	Total Area L x W /10,000 (ha)
N/A	N/A	N/A	N/A	N/A	N/A
Road Area	Landing Area	Total Area	Block Gross Area	Block Net Area	% Disturb. Of Gross Area
N/A	N/A	N/A	N/A	N/A	No permanent roads or landings
Depth of LFH	Hazard Ratings			Permafrost or Frost Heaving	Proposed Harvest Season
	Compaction	Surface Erosion	Displacement		
9cm	Very High	Moderate	Low	No permafrost	Winter
Proportion of Temporary Access Within Net Area to be reforested (explain rehabilitation measures)					
The proportion of temporary access within the NAR will not exceed 10%. These roads and landings will be ripped (as needed) have organic debris scattered on top and planted or allowed to regenerate naturally as part of the NAR. Rehabilitation will be completed within three years of harvest.					

SITE AND HARVEST PLAN

Fire Hazard Abatement (explain measures for slash abatement)									
<p>The current fire hazard is high to extreme. Salvage harvesting and subsequent slash reduction will greatly reduce the potential fire hazard on this site.</p> <p>After harvest, excess slash accumulated at the landings (piles) will be burned within two years of harvest. Otherwise, dispersed slash will be left to contribute to Coarse Woody Debris, small fur-bearer habitat and act as a soil carbon and nutrient supply.</p>									
Forest Health (explain measures to reduce current and future risk of forest to disease and insects)									
<p>This area has been severely attacked by spruce beetle (<i>Dendroctonus Rufipennis</i>). The proportion of merchantable stems that are attacked by beetles (Cruise Beetle Codes 5, 6 & 7) is 81%. Harvesting is prescribed to remove these trees and allow for planted and natural regeneration.</p>									
Additional Comments									
9. REFORESTATION AND DESCRIPTION									
SIS #	Stand #	Net Area to Reforest (ha)	Restocking		Target Stocking (SPH)	Assessment Dates	Regen Surveys		
			Pref Species	Acc Species			Delay to Treat	Regen Surveys	
								Early Stocking	Late Performance
	V17	203.4	Sw	At	1200	H+2	H+5	H+10	
	URS	52.0	As per study	As per study	As per study	N/A	N/A	N/A	
Reforestation Plan									
<p>Natural regeneration supplemented with fill planting where necessary.</p> <p>Stand Number V17 may be left for up to two (2) years after harvest to facilitate establishment of natural regeneration. A regeneration survey should be conducted at this time and any areas found to be not satisfactorily restocked will be planted no later than four (4) years after harvest. The survey will also specify other remedial actions if necessary.</p> <p>For type URS reforestation plan must be consistent with the criteria in the <i>Understory Retention Operational Trial</i> document.</p>									
Establishment to Assessment Date Concerns									
<p>No Brushing concerns anticipated.</p>									
Additional Comments									
FMB									
Approval by:						Date:			
Position:						Signature:			
10. ATTACHMENTS									
Site and Harvest Plan Map @ 1: 10,000									



**INTEGRATED LANDSCAPE PLAN
TIMBER HARVEST PROJECT**

CHAMPAGNE and AISHIHIK
TRADITIONAL TERRITORY
YUKON, CANADA

**AREA 16
SITE AND HARVEST PLAN MAP**

FMU: Y06
Eco-Region: Ruby Range / Southern Lakes
CATT ILP Zone: Forest Resource Management Zone
Sub Zone: Landscape Fuel Abatement
Latitude: 60° 47' 06.2" Longitude: 137° 25' 31.4"
NTS Map Sheet: 115 A
Base Map Information Localized

Area Summary

Area of Interest		298.9
Landscape Buffers	Area ha	Internal Reserve and Natural NP
Wildlife	0.0	Reserve
Riparian	17.5	Non Timber
Visual	0.0	
Other	37.0	
Gross Operable Area	244.4	Net Operable Area
		225.4

Stand Number	Vegetation Type	Inventory Label	Harvest Season	Area ha
V17	V17	SW10-5B9M	W	203.4
URS	V17	SW10-5B9M	W	52.0
-	-	-	-	-
-	-	-	-	-
Net Area to Reforest			Total	255.4

Cruise Information

Timber Type	Net Operable Area (ha)	Net Available Volume (m3/ha)
All (V17)	All (V17)	40,070

Legend

- Net Operable Area

Non Forested

White Spruce
- 1990-1999 Fires

Balsam Poplar

Trembling Aspen
- Base Map
- Highway

Limited Use Road

Pro Temp Rd(Class 4/5)

Loc Temp Rd(Class 2)

Logging Road

Contour (100ft)
- Trail

Cut Line

Watercourses

Wetland

Waterbody

Dry Riverbed/Sand

Scale 1 : 10,000



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Date of Field Work: Summer 2007
IFS Job #: 070224
Contract #: FMB 07-01

FOREST MANAGEMENT BRANCH

SITE AND HARVEST PLAN

1. LOCATION								
District			Geographic Location Name			Mapsheet		
Kluane			Haines Junction Area			115A		
FMU			Latitude		Longitude		SIS#	
Y06			60° 48' 31.5"		137° 22' 06.8"			
Development Area			Block Number			Air Photo Numbers		
Pine Lake Landscape Unit			17			N/A		
2. ECOLOGY AND SITE CONDITION								
Eco-Region			Vegetation Type			Soil Type / Soil Texture		
Ruby Range / Southern Lakes			V17			S6/SiC-C		
Elevation (m)	Slope (%)	Aspect	Terrain	Slope Position	Moist Regime	Soil Drainage	LFH Depth (cm)	NDZ
625-650	2	S	Even	Level	Fresh	Well-Mod.Well	9	Simple Upland (3)
3. BLOCK AREA SUMMARY IN HECTARE								
Area of Interest (ha)	Wildlife Buffers (ha)	Riparian Buffers (ha)	Visual Buffers (ha)	Other Buffers (ha)	Reserve (ha)	Non Timber (ha)	Perm Roads Landings (ha)	Net Area to Reforest (ha)
240.8	9.2			24.5	13.0			194.1
4. HARVEST STAND DESCRIPTION								
Stand Number	Merch Area (ha)	Species	Crown Closure	Age (years)	Avg. Height (m)	Avg. DBH (cm)	Est. Vol/Ha (m³/ha)	
All (V17)	194.1	Sw10	15%	147	19.0	21.2	182	
5. RIPARIAN MANAGEMENT								
Riparian ID#	Class (Stream Wetland Lake)	Reserve Zone Width (m)	Rationale For Reserve	Mngmt Zone Width (m)	Strategies for Management Zone			
Un-named	NCD	0	Water & Habitat	0	No Harvest			
Riparian Comments :								
1. Reserves and Management Zones are as per the <i>Timber Harvest Planning and Operating Guidebook</i> .								
2. Riparian Features are the basis of the <i>CATT Habitat Connectivity Planning Recommendations</i> .								

SITE AND HARVEST PLAN

6. STAND MANAGEMENT OBJECTIVES

HIGHER LEVEL AND OTHER PLANS

This Site and Harvest Plan is consistent with:

- The guiding principles of the *Strategic Forest Management Plan for the Champagne and Aishihik Traditional Territory (CATT)*,
- The *CATT Integrated Landscape Plan* which defines the management priorities and guidelines for Timber Harvest Project Planning.
- And the *CATT Regional Timber Harvesting Project Within The Pine Lake and Canyon Landscape Units* which links the above Landscape Level Strategies, Management Priorities and Guidelines to this Stand Level Operational Plan.

STAND-LEVEL OBJECTIVES

Discuss non-timber values that may be affected by the proposed treatment and measures proposed to accommodate these Traditional or First Nations

Consultation with CAFN members indicated the southern and eastern boundary of this block is frequently used by citizens as a place for teaching young hunting skills, with reference to small game (grouse, rabbits), as well as learning larger game hunting such as moose. As such, it is desired that forest cover is maintained along the Marshall Creek road (suggest a 50m buffer). There is also potential along these areas for heritage resources. An old cabin was built around the old sawmill site at the west end of the block and may indicate potential for heritage resource values in and around the site. The area also provides some level of traditional medicine harvest and berry picking (crowberry, mossberry)

As per the *CATT ILP Heritage and Cultural Guidelines* (section 3.8). Qualified Champagne and Aishihik personnel must conduct a pre-harvest field assessment.

No potential cultural or heritage resource features were noted within the harvest area during the reconnaissance and cruising phases.

If a previously unidentified cultural or heritage resource is encountered during the harvesting or road building operations, operations will cease to the extent necessary to ensure its protection until an assessment can be carried out.

Wildlife Values

Consultation with CAFN citizens and referral with wildlife managers indicated the area as an important area for overland wildlife movement (dispersed rather than as a corridor) from Dezadeash River lowlands to Pine Lake and up/down Marshall Creek. Lynx, coyote, fox and bear are known to occur in this block.

As per the *CATT ILP Forest Ecosystems, Wildlife, and Biological Diversity Guidelines* (section 3.5) appropriate wildlife movement corridors have been maintained at the landscape level focusing on riparian management areas while stand level buffers, reserves and retention have are provided as on block elements to enhance and complement the landscape connectivity. In addition, there are no “Species at Risk” that will be adversely impacted by harvesting on this site.

This block is located within the *CATT ILP FRMZ High Wildlife Value Area*. Therefore all harvest blocks must average 25% retention of stand structure with a range of 10-30%. The total amount of retention in this block (Buffers, Reserves and dispersed leave trees) is 19% by volume.

As per the *Best Management Practices For Northern Goshawk Habitat In The Yukon Territory* any large stick nests found were buffered from harvest by a minimum 200m no-harvest zone connected to the outside of the harvest area. In addition, the stands in this block have a habitat suitability rank “moderate or

SITE AND HARVEST PLAN

lower due to the dead and dying mature canopy.

This block meets all connectivity requirements outlined in the *Habitat Connectivity Planning Recommendations For Forest harvest Planning In The Champagne And Aishihik Traditional Territory*

Fish Water Values

As per the *CATT ILP Watershed and Riparian Management Guidelines* (section 3.6) the cumulative area of this and all other blocks in this landscape unit does not exceed 20% of the watershed area. In addition, the *THPOG* guidelines have been followed for all classified streams in or adjacent to this block (see section 5 *Riparian Management* of this S&HP). All streams encountered were defaulted to fish bearing.

Recr Visual Values

Some past harvesting has occurred adjacent to the southwest and southeast corners of the area of interest. In addition, there are some residential lots located approximately 500m east of the southeast corner, along the old Alaska Highway. Most of the old harvesting areas have been excluded to provide a wide buffer between this area of interest and any residential areas.

Other Values

Fuel Abatement:

This area is located in the *CATT ILP Forest Resource Management Zone* and *Landscape Fuel Abatement Subzone*. As such, it meets the management objectives of:

1. being a stand with >30% beetle attack.
2. having a size, shape and location that “enhances fuel discontinuity”.
3. has a stand structure that allows the implementation silviculture principles to reduce the fire hazard.
4. being close to the Alaska Highway and the communities of Haines Junction and Canyon.

7. SILVICULTURE SYSTEM DESCRIPTION

STAND NUMBER	SILVICULTURE SYSTEM	SEASON	RATIONALE
V17	Natural Shelterwood	Winter	Winter harvest is required due to very high soil compaction hazard.
URS	Refer to note below.	Winter	Refer to note below.
SPS2	Refer to note below.	Winter	Refer to note below.

Dispersed Retention Leave Tree Specs

For the **V17 Type** the target for dispersed retention will be to leave all Deciduous trees and all Non-beetle attacked spruce including as much of the advanced regeneration in the understory as possible. The minimum level of understory retention will be at least 50% of the pre-harvest stems per hectare.

For the URS research trial areas (Treatment Units A, B, C and D) the harvesting constraints are specified in the *Understory Retention Operational Trial* document.

For the SPS2 research trial areas the harvesting constraints are specified in the *Site Preparation Operational Trial* document. SPS2 represents the disc trenching site preparation trial.

Special Management Zone Leave Tree Specs

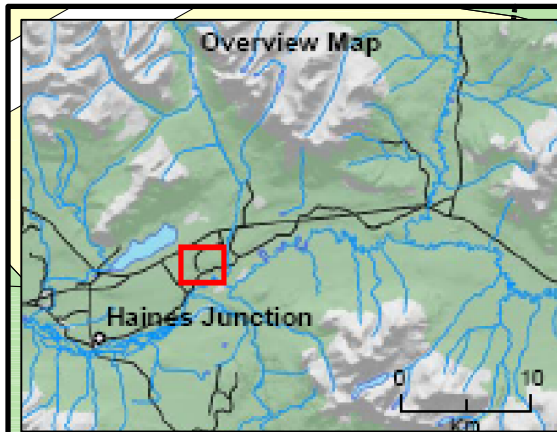
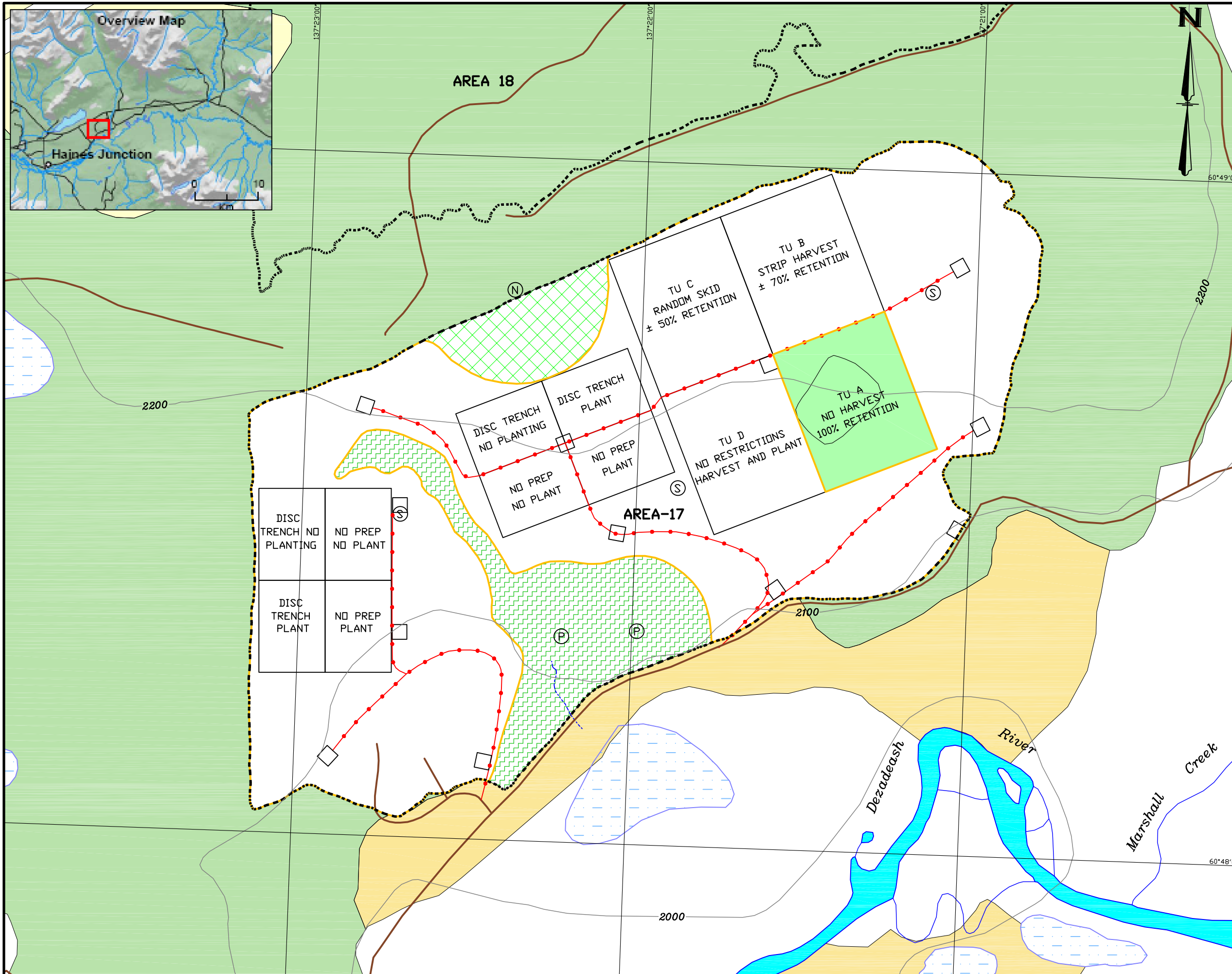
Not Applicable

SITE AND HARVEST PLAN

8. SOIL CONSERVATION					
ON BLOCK PERMANENT DISTURBANCE CALCULATION TAB					
Disturbance Type (Road/landing)	Identification (Name / Number)	Road Standard	Length (m)	Width (m)	Total Area L x W /10,000 (ha)
N/A	N/A	N/A	N/A	N/A	N/A
Road Area	Landing Area	Total Area	Block Gross Area	Block Net Area	% Disturb. Of Gross Area
N/A	N/A	N/A	N/A	N/A	No permanent roads or landings
Depth of LFH	Hazard Ratings			Permafrost or Frost Heaving	Proposed Harvest Season
	Compaction	Surface Erosion	Displacement		
9cm	Very High	Moderate	Low to Moderate	No permafrost	Winter
Proportion of Temporary Access Within Net Area to be reforested (explain rehabilitation measures)					
The proportion of temporary access within the NAR will not exceed 10%. These roads and landings will be ripped (as needed) have organic debris scattered on top and planted or allowed to regenerate naturally as part of the NAR. Rehabilitation will be completed within three years of harvest.					
Fire Hazard Abatement (explain measures for slash abatement)					
The current fire hazard is high to extreme. Salvage harvesting and subsequent slash reduction will greatly reduce the potential fire hazard on this site.					
After harvest, excess slash accumulated at the landings (piles) will be burned within two years of harvest. Otherwise, dispersed slash will be left to contribute to Coarse Woody Debris, small fur-bearer habitat and act as a soil carbon and nutrient supply.					
Forest Health (explain measures to reduce current and future risk of forest to disease and insects)					
This area has been severely attacked by spruce beetle (<i>Dendroctonus Rufipennis</i>). The proportion of merchantable stems that are attacked by beetles (Cruise Beetle Codes 5, 6 & 7) is 84%. Harvesting is prescribed to remove these trees and allow for planted and natural regeneration.					
Additional Comments					

SITE AND HARVEST PLAN

9. REFORESTATION AND DESCRIPTION								
SIS #	Stand #	Net Area to Reforest	Restocking		Target Stocking (SPH)	Assessment Dates Delay to Treat	Regen Surveys	
			Pref Species	Acc Species			Early Stocking	Late Performance
	V17	106.1	Sw	At	1200	H+2	H+5	H+10
	URS	52.0	As per study	As per study	As per study	N/A	N/A	N/A
	SPS2	36.0	As per study	As per study	As per study	N/A	N/A	N/A
Reforestation Plan <p>Natural regeneration supplemented with fill planting where necessary.</p> <p>Stand Number V17 may be left for up to two (2) years after harvest to facilitate establishment of natural regeneration. A regeneration survey should be conducted at this time and any areas found to be not satisfactorily restocked will be planted no later than four (4) years after harvest. The survey will also specify other remedial actions if necessary.</p> <p>For type URS reforestation plan must be consistent with the criteria in the <i>Understory Retention Operational Trial</i> document.</p> <p>For type SPS2 reforestation plan must be consistent with the criteria in the <i>Site Preparation Operational Trial</i> document.</p>								
Establishment to Assessment Date Concerns <p>No Brushing concerns anticipated.</p>								
Additional Comments 								
FMB								
Approval by:					Date:			
Position:					Signature:			
10. ATTACHMENTS <p style="text-align: center;">Site and Harvest Plan Map @ 1: <u>10,000</u></p>								



INTEGRATED LANDSCAPE PLAN TIMBER HARVEST PROJECT

CHAMPAGNE and AISHIHIK
TRADITIONAL TERRITORY
YUKON, CANADA

AREA 17
SITE AND HARVEST PLAN MAP

FMU: Y06
Eco-Region: Ruby Range / Southern Lakes
CATT ILP Zone: Forest Resource Mangement Zone
Sub Zone: Landscape Fuel Abatement
Latitude: 60° 48' 31.5" Longitude: 137° 22' 06.8"
NTS Map Sheet: 115 A
Base Map Information Localized

Area Summary

Area of Interest		240.8	
Landscape Buffers	Area ha	Internal Reserve and Natural NP	Area ha
Wildlife	9.2	Reserve	13.0
Riparian	0.0	Non Timber	0.0
Visual	0.0		
Other	24.5		
Gross Operable Area	207.1	Net Operable Area	194.1

Stand Number	Vegetation Type	Inventory Label	Harvest Season	Area ha
V17	V17	SW10-5B6M	W	106.1
URS	V17	SW10-5B6M	W	52.0
SPS2	V17	SW10-5B6M	W	36.0
-	-	-	-	-
Net Area to Reforest			Total	194.1

Cruise Information

Timber Type	Net Operable Area (ha)	Net Available Volume (m3/ha)
All (V17)	All (V17)	35,405

Legend

Net Operable Area

Non Forested

White Spruce

1990-1999 Fires

Balsam Poplar

Trembling Aspen

Base Map

Highway

Limited Use Road

Pro Temp Rd(Class 4/5)

Loc Temp Rd(Class 2)

Logging Road

Contour (100ft)

Trail

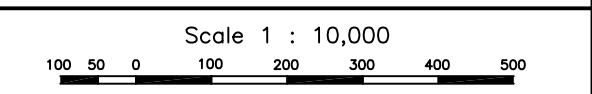
Cut Line

Watercourses

Wetland

Waterbody

Dry Riverbed/Sand



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Date Drawn: Feb 21/07
Date of Field Work: Summer 2007
IFS Job #: 070224
Contract #: FMB 07-01

FOREST MANAGEMENT BRANCH

SITE AND HARVEST PLAN

1. LOCATION								
District			Geographic Location Name			Mapsheet		
Kluane			Haines Junction Area			115A		
FMU			Latitude		Longitude		SIS#	
Y06			60° 49' 20.5"		137° 22' 00.4"			
Development Area			Block Number			Air Photo Numbers		
Pine Lake Landscape Unit			18			N/A		
2. ECOLOGY AND SITE CONDITION								
Eco-Region			Vegetation Type			Soil Type / Soil Texture		
Ruby Range / Southern Lakes			V17			S3-S6/SiL-SiC		
Elevation (m)	Slope (%)	Aspect	Terrain	Slope Position	Moist Regime	Soil Drainage	LFH Depth (cm)	NDZ
670	4	S	Even	Level	Very Fresh-Very Moist	Well-Imperfect	12	Simple Upland (3)
3. BLOCK AREA SUMMARY IN HECTARE								
Area of Interest (ha)	Wildlife Buffers (ha)	Riparian Buffers (ha)	Visual Buffers (ha)	Other Buffers (ha)	Reserve (ha)	Non Timber (ha)	Perm Roads Landings (ha)	Net Area to Reforest (ha)
277.0	22.4	75.8	16.0	3.0	13.0			146.8
4. HARVEST STAND DESCRIPTION								
Stand Number	Merch Area (ha)	Species	Crown Closure	Age (years)	Avg. Height (m)	Avg. DBH (cm)	Est. Vol/Ha (m³/ha)	
All (V17)	146.8	Sw10	10%	159	18.3	20.7	168	
5. RIPARIAN MANAGEMENT								
Riparian ID#	Class (Stream Wetland Lake)	Reserve Zone Width (m)	Rationale For Reserve	Mngmt Zone Width (m)	Strategies for Management Zone			
Un-named	Class 2 Wetland (1-5ha.)	60	Habitat & Connectivity	40	No Harvest			
Riparian Comments :								
1. Reserves and Management Zones are as per the <i>Timber Harvest Planning and Operating Guidebook</i> .								
2. Riparian Features are the basis of the <i>CATT Habitat Connectivity Planning Recommendations</i> .								

SITE AND HARVEST PLAN

6. STAND MANAGEMENT OBJECTIVES

HIGHER LEVEL AND OTHER PLANS

This Site and Harvest Plan is consistent with:

- The guiding principles of the *Strategic Forest Management Plan for the Champagne and Aishihik Traditional Territory (CATT)*,
- The *CATT Integrated Landscape Plan* which defines the management priorities and guidelines for Timber Harvest Project Planning.
- And the *CATT Regional Timber Harvesting Project Within The Pine Lake and Canyon Landscape Units* which links the above Landscape Level Strategies, Management Priorities and Guidelines to this Stand Level Operational Plan.

STAND-LEVEL OBJECTIVES

Discuss non-timber values that may be affected by the proposed treatment and measures proposed to accommodate these Traditional or First Nations

Consultation with CAFN citizens indicated the likelihood of heritage resources in this block. The area along the roadway on the east side of the block is valued as a place to hunt game, teach young land-based skills (harvesting of small game). CAFN would like to see a buffer maintained between the roadway and the interior of the harvest block. The same locations may have higher potential for heritage resources than areas within the block.

As per the *CATT ILP Heritage and Cultural Guidelines* (section 3.8), qualified Champagne and Aishihik personnel must conduct a pre-harvest field assessment.

No potential cultural or heritage resource features were noted within the harvest area during the reconnaissance and cruising phases.

If a previously unidentified cultural or heritage resource is encountered during the harvesting or road building operations, operations will cease to the extent necessary to ensure its protection until an assessment can be carried out.

Wildlife Values

Moose are known to use this area extensively, including the central wetlands and game trails to and from other wetland areas between Marshall Creek, Pine Lake and Dezadeash River. Moose are frequently seen traversing the highway north of this block.

As per the *CATT ILP Forest Ecosystems, Wildlife, and Biological Diversity Guidelines* (section 3.5) appropriate wildlife movement corridors have been maintained at the landscape level focusing on riparian management areas while stand level buffers, reserves and retention have are provided as on block elements to enhance and complement the landscape connectivity. In addition, there are no “Species at Risk” that will be adversely impacted by harvesting on this site.

This block is located within the *CATT ILP FRMZ High Wildlife Value Area*. Therefore all harvest blocks must average 25% retention of stand structure with a range of 10-30%. The total amount of retention in this block (Buffers, Reserves and dispersed leave trees) is 47% by volume.

As per the *Best Management Practices For Northern Goshawk Habitat In The Yukon Territory* any large stick nests found were buffered from harvest by a minimum 200m no-harvest zone connected to the outside of the harvest area. In addition, the stands in this block have a habitat suitability rank “moderate or lower due to the dead and dying mature canopy.

SITE AND HARVEST PLAN

This block meets all connectivity requirements outlined in the *Habitat Connectivity Planning Recommendations For Forest harvest Planning In The Champagne And Aishihik Traditional Territory*

Fish Water Values

As per the *CATT ILP Watershed and Riparian Management Guidelines* (section 3.6) the cumulative area of this and all other blocks in this landscape unit does not exceed 20% of the watershed area. In addition, the *THPOG* guidelines have been followed for all classified streams in or adjacent to this block (see section 5 *Riparian Management* of this S&HP). All streams encountered were defaulted to fish bearing.

Recreational Visual Values

As per section 3.7 of the CATT ILP, visual concerns adjacent to the Alaska Highway have been addressed by leaving an un-harvested buffer. The minimum width for this area of interest is 60m.

Other Values

Fuel Abatement:

This area is located in the *CATT ILP Forest Resource Management Zone* and *Landscape Fuel Abatement Subzone*. As such, it meets the management objectives of:

1. being a stand with >30% beetle attack.
2. having a size, shape and location that “enhances fuel discontinuity”.
3. has a stand structure that allows the implementation silviculture principles to reduce the fire hazard.
4. being close to the Alaska Highway and the communities of Haines Junction and Canyon.

7. SILVICULTURE SYSTEM DESCRIPTION

STAND NUMBER	SILVICULTURE SYSTEM	SEASON	RATIONALE
V17	Natural Shelterwood	Winter	Winter harvest due to very high soil compaction hazard.
URS	Refer to note below.	Winter	Refer to note below.
SPS1	Refer to note below.	Winter	Refer to note below.

Dispersed Retention Leave Tree Specs

For the **V17 Type** the target for dispersed retention will be to leave all Deciduous trees and all Non-beetle attacked spruce including as much of the advanced regeneration in the understory as possible. The minimum level of understory retention will be at least 50% of the pre-harvest stems per hectare.

For the URS research trial areas (Treatment Units A, B, C and D) the harvesting constraints are specified in the *Understory Retention Operational Trial* document.

For the SPS1 research trial areas the harvesting constraints are specified in the *Site Preparation Operational Trial* document. SPS1 represents the mounding site preparation trial.

Special Management Zone Leave Tree Specs

Not Applicable

8. SOIL CONSERVATION

ON BLOCK PERMANENT DISTURBANCE CALCULATION TAB

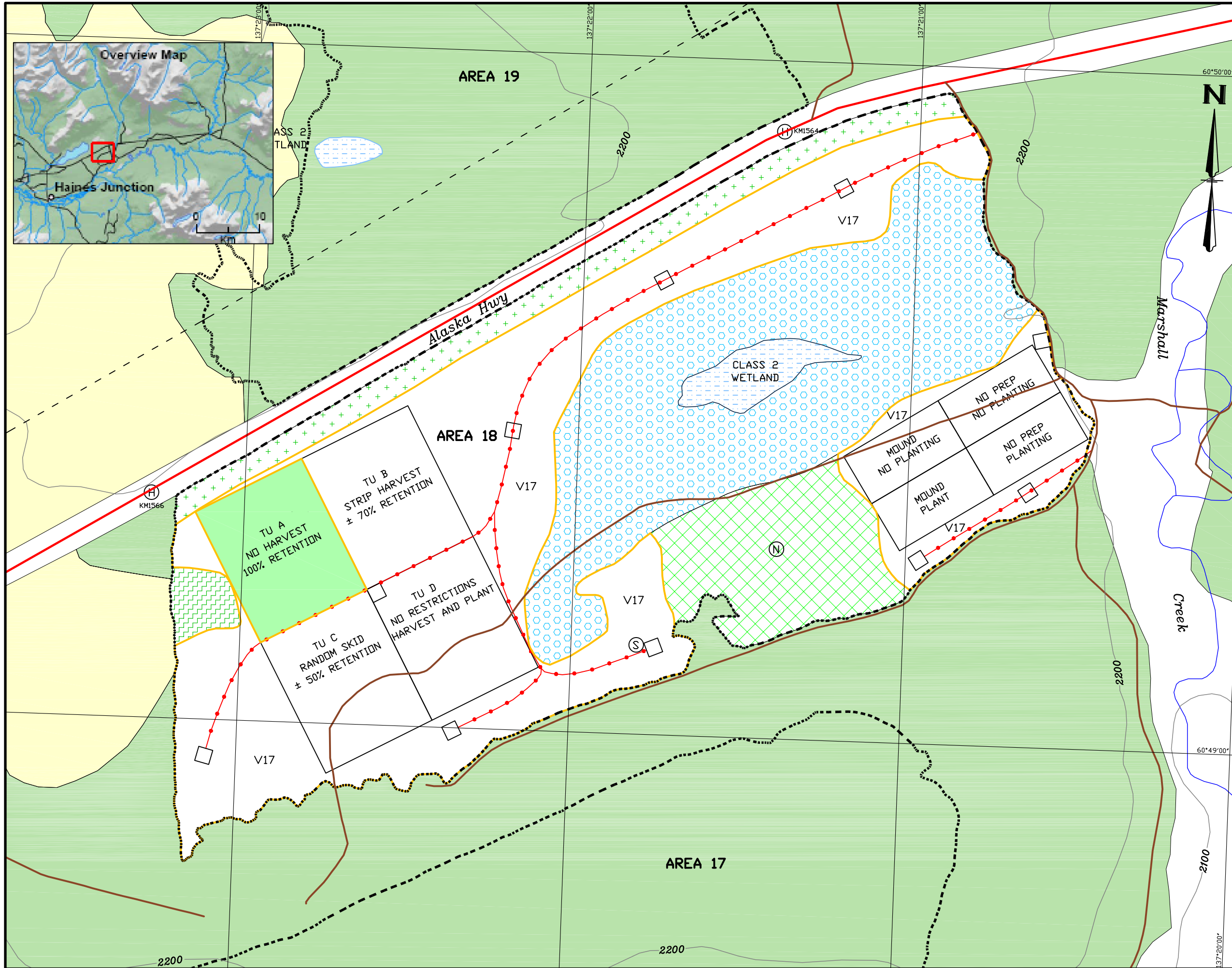
Disturbance Type (Road/landing)	Identification (Name / Number)	Road Standard	Length (m)	Width (m)	Total Area L x W /10,000 (ha)
N/A	N/A	N/A	N/A	N/A	N/A
Road Area	Landing Area	Total Area	Block Gross Area	Block Net Area	% Disturb. Of Gross Area
N/A	N/A	N/A	N/A	N/A	No permanent roads or landings

SITE AND HARVEST PLAN

Depth of LFH	Hazard Ratings			Permafrost or Frost Heaving	Proposed Harvest Season				
	Compaction	Surface Erosion	Displacement						
12cm	High to Very High	Moderate to High	Moderate	No permafrost	Winter				
Proportion of Temporary Access Within Net Area to be reforested (explain rehabilitation measures)									
The proportion of temporary access within the NAR will not exceed 10%. These roads and landings will be ripped (as needed) have organic debris scattered on top and planted or allowed to regenerate naturally as part of the NAR. Rehabilitation will be completed within three years of harvest.									
Fire Hazard Abatement (explain measures for slash abatement)									
The current fire hazard is high to extreme. Salvage harvesting and subsequent slash reduction will greatly reduce the potential fire hazard on this site.									
After harvest, excess slash accumulated at the landings (piles) will be burned within two years of harvest. Otherwise, dispersed slash will be left to contribute to Coarse Woody Debris, small fur-bearer habitat and act as a soil carbon and nutrient supply.									
Forest Health (explain measures to reduce current and future risk of forest to disease and insects)									
This area has been severely attacked by spruce beetle (<i>Dendroctonus Rufipennis</i>). The proportion of merchantable stems that are attacked by beetles (Cruise Beetle Codes 5, 6 & 7) is 89%. Harvesting is prescribed to remove these trees and allow for planted and natural regeneration.									
Additional Comments									
9. REFORESTATION AND DESCRIPTION									
SIS #	Stand #	Net Area to Reforest	Restocking		Target Stocking (SPH)	Assessment Dates			
			Pref Species	Acc Species		Delay to Treat	Regen Surveys		
							Early Stocking	Late Performance	
	V17	76.8	Sw	At	1200	H+2	H+5	H+10	
	URS	52.0	As per study	As per study	As per study	N/A	N/A	N/A	
	SPS1	18.0	As per study	As per study	As per study	N/A	N/A	N/A	
Reforestation Plan									
Natural regeneration supplemented with fill planting where necessary.									
Stand Number V17 may be left for up to two (2) years after harvest to facilitate establishment of natural regeneration. A regeneration survey should be conducted at this time and any areas found to be not satisfactorily restocked will be planted no later than four (4) years after harvest. The survey will also specify other remedial actions if necessary.									
For type URS reforestation plan must be consistent with the criteria in the <i>Understory Retention Operational Trial</i> document.									
For type SPS1 reforestation plan must be consistent with the criteria in the <i>Site Preparation Operational Trial</i> document.									
Establishment to Assessment Date Concerns									
No Brushing concerns anticipated.									
Additional Comments									

SITE AND HARVEST PLAN

FMB			
Approval by:		Date:	
Position:		Signature:	
10. ATTACHMENTS			
Site and Harvest Plan Map @ 1: <u>10,000</u>			










**INTEGRATED LANDSCAPE PLAN
TIMBER HARVEST PROJECT**

CHAMPAGNE and AISHIHIK
TRADITIONAL TERRITORY
YUKON, CANADA

**AREA 18
SITE AND HARVEST PLAN MAP**

FMU: Y06
Eco-Region: Ruby Range / Southern Lakes
CATT ILP Zone: Forest Resource Mangement Zone
Sub Zone: Landscape Fuel Abatement
Latitude: 60° 49' 20.5" Longitude: 137° 22' 00.4"
NTS Map Sheet: 115 A
Base Map Information Localized

Area Summary

Area of Interest		277.0	
Landscape Buffers	Area ha	Internal Reserve and Natural NP	Area ha
 Wildlife	22.4	 Reserve	13.0
 Riparian	75.8	 Non Timber	0.0
 Visual	16.0		
 Other	3.0		
Gross Operable Area	159.8	 Net Operable Area	146.8

Stand Number	Vegetation Type	Inventory Label	Harvest Season	Area ha
V17	V17	SW10-5B7M	W	76.8
URS	V17	SW10-5B7M	W	52.0
SPS1	V17	SW10-5B7M	W	18.0
-	-	-	-	-
Net Area to Reforest			Total	146.8

Cruise Information

Timber Type	Net Operable Area (ha)	Net Available Volume (m3/ha)
All (V17)	All (V17)	24,636

Legend

- Net Operable Area

Non Forested

White Spruce
- 1990-1999 Fires

Balsam Poplar

Trembling Aspen
- Base Map

Highway

Limited Use Road

Pro Temp Rd(Class 4/5)

Loc Temp Rd(Class 2)

Logging Road

Contour (100ft)

Trail

Cut Line

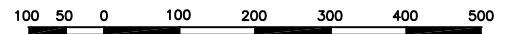
Watercourses

Wetland

Waterbody

Dry Riverbed/Sand

Scale 1 : 10,000



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PH: (250) 564-4115 FAX: (250) 563-9679
Date Drawn: Feb 21/07
Date of Field Work: Summer 2007
IFS Job #: 070224
Contract #: FMB 07-01

FOREST MANAGEMENT BRANCH

SITE AND HARVEST PLAN

1. LOCATION								
District			Geographic Location Name				Mapsheet	
Kluane			Haines Junction Area				115A	
FMU			Latitude		Longitude		SIS#	
Y06			60° 49' 55.2"		137° 22' 25.4"			
Development Area			Block Number			Air Photo Numbers		
Pine Lake Landscape Unit			19			N/A		
2. ECOLOGY AND SITE CONDITION								
Eco-Region			Vegetation Type			Soil Type / Soil Texture		
Ruby Range / Southern Lakes			V17			S9-S10/SiL-SiCL		
Elevation (m)	Slope (%)	Aspect	Terrain	Slope Position	Moist Regime	Soil Drainage	LFH Depth (cm)	NDZ
665-685	3	SE	Even	Level	Moist	Mod. Well	11	Simple Upland (3)
3. BLOCK AREA SUMMARY IN HECTARE								
Area of Interest (ha)	Wildlife Buffers (ha)	Riparian Buffers (ha)	Visual Buffers (ha)	Other Buffers (ha)	Reserve (ha)	Non Timber (ha)	Perm Roads Landings (ha)	Net Area to Reforest (ha)
121.4	16.7	13.1	9.5	14.0	3.7	2.4		62.0
4. HARVEST STAND DESCRIPTION								
Stand Number	Merch Area (ha)	Species	Crown Closure	Age (years)	Avg. Height (m)	Avg. DBH (cm)	Est. Vol/Ha (m³/ha)	
All (V17)	62.0	Sw10	20%	155	18.1	21.3	174	
5. RIPARIAN MANAGEMENT								
Riparian ID#	Class (Stream Wetland Lake)	Reserve Zone Width (m)	Rationale For Reserve	Mngmt Zone Width (m)	Strategies for Management Zone			
Un-named	Class 2 Wetlands (1-5ha.)	60	Habitat & Connectivity	40	No Harvest			
Riparian Comments :								
1. Reserves and Management Zones are as per the <i>Timber Harvest Planning and Operating Guidebook</i> .								
2. Riparian Features are the basis of the <i>CATT Habitat Connectivity Planning Recommendations</i> .								

SITE AND HARVEST PLAN

6. STAND MANAGEMENT OBJECTIVES

HIGHER LEVEL AND OTHER PLANS

This Site and Harvest Plan is consistent with:

- The guiding principles of the *Strategic Forest Management Plan for the Champagne and Aishihik Traditional Territory (CATT)*,
- The *CATT Integrated Landscape Plan* which defines the management priorities and guidelines for Timber Harvest Project Planning.
- And the *CATT Regional Timber Harvesting Project Within The Pine Lake and Canyon Landscape Units* which links the above Landscape Level Strategies, Management Priorities and Guidelines to this Stand Level Operational Plan.

STAND-LEVEL OBJECTIVES

Discuss non-timber values that may be affected by the proposed treatment and measures proposed to accommodate these Traditional or First Nations

As per the *CATT ILP Heritage and Cultural Guidelines* (section 3.8), qualified Champagne and Aishihik personnel must conduct a pre-harvest field assessment.

No potential cultural or heritage resource features were noted within the harvest area during the reconnaissance and cruising phases, nor by the CAFN crew that conducted an initial field reconnaissance trip.

If a previously unidentified cultural or heritage resource is encountered during the harvesting or road building operations, operations will cease to the extent necessary to ensure its protection until an assessment can be carried out.

Wildlife Values

Consultation with CAFN citizens indicated the area as being important for overland wildlife movement (dispersed rather than as a corridor) from Dezadeash River lowlands to Pine Lake. A series of very important wetlands exists to the north of the block. This area has been addressed in the connectivity report and map.

As per the *CATT ILP Forest Ecosystems, Wildlife, and Biological Diversity Guidelines* (section 3.5) appropriate wildlife movement corridors have been maintained at the landscape level focusing on riparian management areas while stand level buffers, reserves and retention have are provided as on block elements to enhance and complement the landscape connectivity. In addition, there are no “Species at Risk” that will be adversely impacted by harvesting on this site.

This block is located within the *CATT ILP FRMZ High Wildlife Value Area*. Therefore all harvest blocks must average 25% retention of stand structure with a range of 10-30%. The total amount of retention in this block (Buffers, Reserves and dispersed leave trees) is 47% by volume.

As per the *Best Management Practices For Northern Goshawk Habitat In The Yukon Territory* any large stick nests found were buffered from harvest by a minimum 200m no-harvest zone connected to the outside of the harvest area. In addition, the stands in this block have a habitat suitability rank “moderate or lower due to the dead and dying mature canopy.

This block meets all connectivity requirements outlined in the *Habitat Connectivity Planning Recommendations For Forest harvest Planning In The Champagne And Aishihik Traditional Territory*

SITE AND HARVEST PLAN

Fish Water Values

As per the *CATT ILP Watershed and Riparian Management Guidelines* (section 3.6) the cumulative area of this and all other blocks in this landscape unit does not exceed 20% of the watershed area. In addition, the *THPOG* guidelines have been followed for all classified streams in or adjacent to this block (see section 5 *Riparian Management* of this S&HP). All streams encountered were defaulted to fish bearing.

Recr Visual Values

As per section 3.7 of the CATT ILP, visual concerns adjacent to the Alaska Highway have been addressed by leaving an un-harvested buffer. The minimum width for this area of interest is 60m.

A tree stand (for hunting) was noted just outside the west boundary, at the edge of the old fire that defines the Block 19 boundary. It appears that this stand was built when the average height of the vegetation in the burned area was shorter than it is today. However, continued re-growth of the burned area has negated the strategic value of this stand.

Other Values

Mineral Claims:

A claim post was noted in this area. The posts will be left standing. No other action required as removal of timber facilitates mining activities.

Fuel Abatement:

This area is located in the *CATT ILP Forest Resource Management Zone* and *Landscape Fuel Abatement Subzone*. As such, it meets the management objectives of:

1. being a stand with >30% beetle attack.
2. having a size, shape and location that “enhances fuel discontinuity”.
3. has a stand structure that allows the implementation silviculture principles to reduce the fire hazard.
4. being close to the Alaska Highway and the communities of Haines Junction and Canyon..

7. SILVICULTURE SYSTEM DESCRIPTION

STAND NUMBER	SILVICULTURE SYSTEM	SEASON	RATIONALE
V17	Natural Shelterwood	Winter	Winter harvest is required due to high soil compaction hazard.

Dispersed Retention Leave Tree Specs

For the **V17 Type** the target for dispersed retention will be to leave all Deciduous trees and all Non-beetle attacked spruce including as much of the advanced regeneration in the understory as possible. The minimum level of understory retention will be at least 50% of the pre-harvest stems per hectare.

Special Management Zone Leave Tree Specs

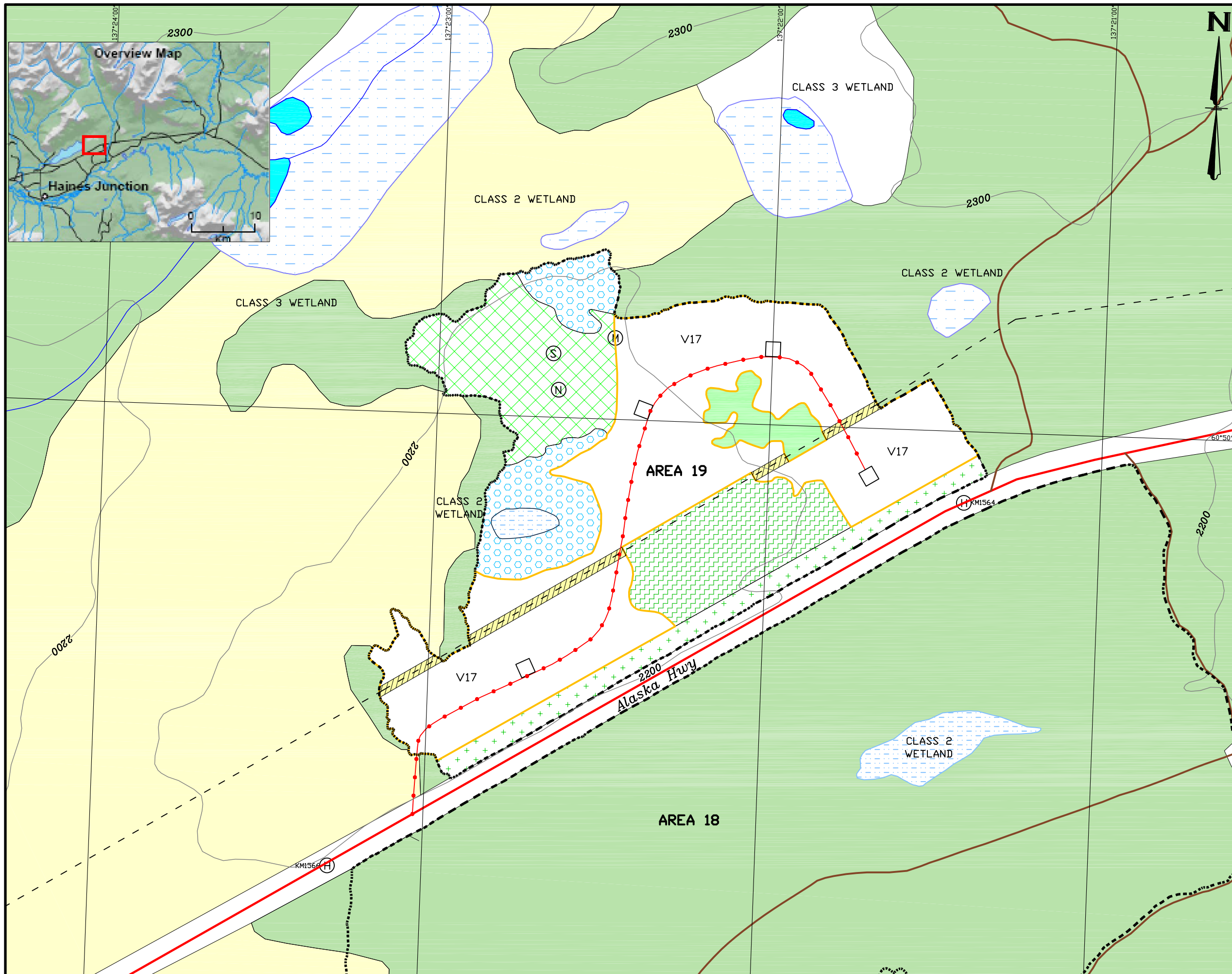
Not Applicable

SITE AND HARVEST PLAN

8. SOIL CONSERVATION					
ON BLOCK PERMANENT DISTURBANCE CALCULATION TAB					
Disturbance Type (Road/landing)	Identification (Name / Number)	Road Standard	Length (m)	Width (m)	Total Area L x W /10,000 (ha)
N/A	N/A	N/A	N/A	N/A	N/A
Road Area	Landing Area	Total Area	Block Gross Area	Block Net Area	% Disturb. Of Gross Area
N/A	N/A	N/A	N/A	N/A	No permanent roads or landings
Depth of LFH	Hazard Ratings			Permafrost or Frost Heaving	Proposed Harvest Season
	Compaction	Surface Erosion	Displacement		
11cm	High	High	Moderate	No permafrost	Winter
Proportion of Temporary Access Within Net Area to be reforested (explain rehabilitation measures)					
The proportion of temporary access within the NAR will not exceed 10%. These roads and landings will be ripped (as needed) have organic debris scattered on top and planted or allowed to regenerate naturally as part of the NAR. Rehabilitation will be completed within three years of harvest.					
Fire Hazard Abatement (explain measures for slash abatement)					
The current fire hazard is high to extreme. Salvage harvesting and subsequent slash reduction will greatly reduce the potential fire hazard on this site.					
After harvest, excess slash accumulated at the landings (piles) will be burned within two years of harvest. Otherwise, dispersed slash will be left to contribute to Coarse Woody Debris, small fur-bearer habitat and act as a soil carbon and nutrient supply.					
Forest Health (explain measures to reduce current and future risk of forest to disease and insects)					
This area has been severely attacked by spruce beetle (<i>Dendroctonus Rufipennis</i>). The proportion of merchantable stems that are attacked by beetles (Cruise Beetle Codes 5, 6 & 7) is 83%. Harvesting is prescribed to remove these trees and allow for planted and natural regeneration.					
Additional Comments					

SITE AND HARVEST PLAN

9. REFORESTATION AND DESCRIPTION								
SIS #	Stand #	Net Area to Reforest (ha)	Restocking		Target Stocking (SPH)	Assessment Dates Delay to Treat	Regen Surveys	
			Pref Species	Acc Species			Early Stocking	Late Performance
	V17	62.0	Sw	At	1200	H+2	H+5	H+10
Reforestation Plan								
<p>Natural regeneration supplemented with fill planting where necessary.</p> <p>Stand Number V17 may be left for up to two (2) years after harvest to facilitate establishment of natural regeneration. A regeneration survey should be conducted at this time and any areas found to be not satisfactorily restocked will be planted no later than four (4) years after harvest. The survey will also specify other remedial actions if necessary.</p>								
Establishment to Assessment Date Concerns								
No Brushing concerns anticipated.								
Additional Comments								
FMB								
Approval by:				Date:				
Position:				Signature:				
10. ATTACHMENTS								
Site and Harvest Plan Map @ 1: <u>10,000</u>								



INTEGRATED LANDSCAPE PLAN TIMBER HARVEST PROJECT

CHAMPAGNE and AISHIHIK
TRADITIONAL TERRITORY
YUKON, CANADA

AREA 19 SITE AND HARVEST PLAN MAP

FMU: Y06
Eco-Region: Ruby Range / Southern Lakes
CATT ILP Zone: Forest Resource Management Zone
Sub Zone: Landscape Fuel Abatement
Latitude: 60° 49' 55.2" Longitude: 137° 22' 25.4"
NTS Map Sheet: 115 A
Base Map Information Localized

Area Summary

Area of Interest		121.4
Landscape Buffers	Area ha	Internal Reserve and Natural NP Area ha
Wildlife	16.7	Reserve 3.7
Riparian	13.1	Non Timber 2.4
Visual	9.5	
Other	14.0	
Gross Operable Area	68.1	Net Operable Area 62.0

Stand Number	Vegetation Type	Inventory Label	Harvest Season	Area ha
V17	V17	SW10-5A6M	W	62.0
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
Net Area to Reforest			Total	62.0

Cruise Information

Timber Type	Net Operable Area (ha)	Net Available Volume (m3/ha)
All (V17)	All (V17)	10,816

Legend

Net Operable Area	1990-1999 Fires
Non Forested	Balsam Poplar
White Spruce	Trembling Aspen
Highway	Trail
Limited Use Road	Cut Line
Pro Temp Rd(Class 4/5)	Watercourses
Loc Temp Rd(Class 2)	Wetland
Logging Road	Waterbody
Contour (100ft)	Dry Riverbed/Sand

Scale 1 : 10,000
100 50 0 100 200 300 400 500



INDUSTRIAL FORESTRY SERVICE LTD.
1595 Fifth Avenue
Prince George, B.C.
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PH: (250) 564-4115 FAX: (250) 563-9679
Date Drawn: Feb 21/07
Date of Field Work: Summer 2007
IFS Job #: 070224
Contract #: FMB 07-01

FOREST MANAGEMENT BRANCH

SITE AND HARVEST PLAN

1. LOCATION								
District			Geographic Location Name			Mapsheet		
Kluane			Haines Junction Area			115A		
FMU			Latitude		Longitude		SIS#	
Y06			60° 50' 44.5"		137° 08' 55.0"			
Development Area			Block Number			Air Photo Numbers		
Canyon Landscape Unit			21			N/A		
2. ECOLOGY AND SITE CONDITION								
Eco-Region			Vegetation Type			Soil Type / Soil Texture		
Ruby Range / Southern Lakes			V17			S5/SiCL		
Elevation (m)	Slope (%)	Aspect	Terrain	Slope Position	Moist Regime	Soil Drainage	LFH Depth (cm)	NDZ
645-685	5	Flat	Even	Level	Fresh-Very Fresh	Mod. Well	4	Simple Upland (3)
3. BLOCK AREA SUMMARY IN HECTARE								
Area of Interest (ha)	Wildlife Buffers (ha)	Riparian Buffers (ha)	Visual Buffers (ha)	Other Buffers (ha)	Reserve (ha)	Non Timber (ha)	Perm Roads Landings (ha)	Net Area to Reforest (ha)
256.1	10.7		29.9	27.5	11.5			176.5
4. HARVEST STAND DESCRIPTION								
Stand Number	Merch Area (ha)	Species	Crown Closure	Age (years)	Avg. Height (m)	Avg. DBH (cm)	Est. Vol/Ha (m³/ha)	
All (V17)	176.5	Sw10	20%	125	14.1	19.0	76	
5. RIPARIAN MANAGEMENT								
Riparian ID#	Class (Stream Wetland Lake)	Reserve Zone Width (m)	Rationale For Reserve	Mngmt Zone Width (m)	Strategies for Management Zone			
N/A	N/A	N/A	N/A	N/A	N/A			
Riparian Comments :								
1. Reserves and Management Zones are as per the <i>Timber Harvest Planning and Operating Guidebook</i> .								
2. Riparian Features are the basis of the <i>CATT Habitat Connectivity Planning Recommendations</i> .								

SITE AND HARVEST PLAN

6. STAND MANAGEMENT OBJECTIVES

HIGHER LEVEL AND OTHER PLANS

This Site and Harvest Plan is consistent with:

- The guiding principles of the *Strategic Forest Management Plan for the Champagne and Aishihik Traditional Territory (CATT)*,
- The *CATT Integrated Landscape Plan* which defines the management priorities and guidelines for Timber Harvest Project Planning.
- And the *CATT Regional Timber Harvesting Project Within The Pine Lake and Canyon Landscape Units* which links the above Landscape Level Strategies, Management Priorities and Guidelines to this Stand Level Operational Plan.

STAND-LEVEL OBJECTIVES

Discuss non-timber values that may be affected by the proposed treatment and measures proposed to accommodate these Traditional or First Nations

Consultation with CAFN citizens indicated the block has current value for hunting game along the old Alaska highway right of way. Members are interested in ensuring there is suitable forest cover protected along either side of the roadway. The southern boundary along the terrace above the Dezadeash River likely has a high probability of heritage resources. The 100 metre wildlife buffer may provide the protection for these possible sites.

No potential cultural or heritage resource features were noted within the harvest area during the reconnaissance and cruising phases.

If a previously unidentified cultural or heritage resource is encountered during the harvesting or road building operations, operations will cease to the extent necessary to ensure its protection until an assessment can be carried out.

Wildlife Values

As per the *CATT ILP Forest Ecosystems, Wildlife, and Biological Diversity Guidelines* (section 3.5) appropriate wildlife movement corridors have been maintained at the landscape level focusing on riparian management areas while stand level buffers, reserves and retention have are provided as on block elements to enhance and complement the landscape connectivity. In addition, there are no “Species at Risk” that will be adversely impacted by harvesting on this site.

This block is located within the *CATT ILP FRMZ High Wildlife Value Area*. Therefore all harvest blocks must average 25% retention of stand structure with a range of 10-30%. The total amount of retention in this block (Buffers, Reserves and dispersed leave trees) is 32% by volume.

This block meets all connectivity requirements outlined in the *Habitat Connectivity Planning Recommendations For Forest harvest Planning In The Champagne And Aishihik Traditional Territory*

Fish Water Values

As per the *CATT ILP Watershed and Riparian Management Guidelines* (section 3.6) the cumulative area of this and all other blocks in this landscape unit does not exceed 20% of the watershed area. In addition, the *THPOG* guidelines have been followed for all classified streams in or adjacent to this block (see section 5 *Riparian Management* of this S&HP). All streams encountered were defaulted to fish bearing.

Recr Visual Values

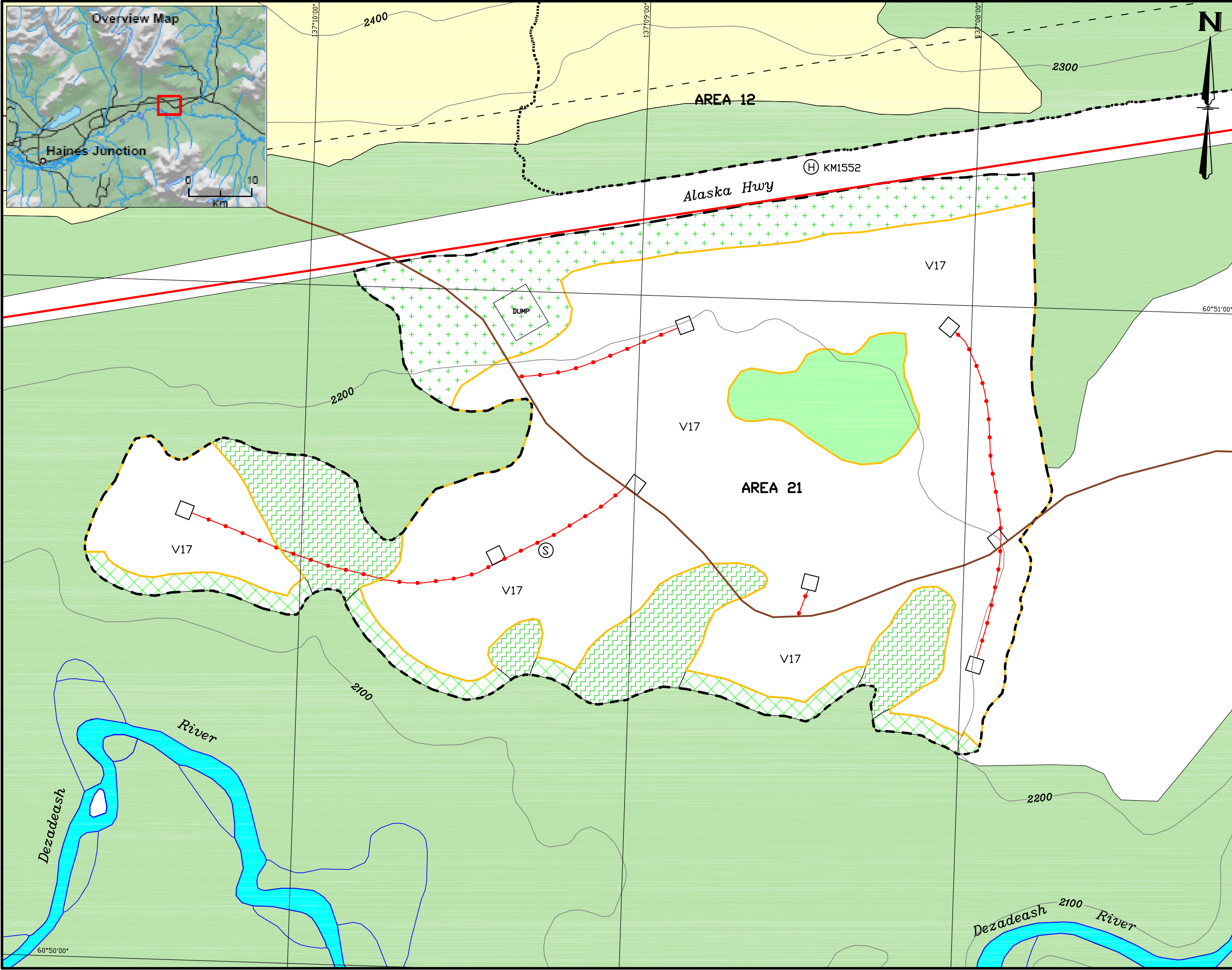
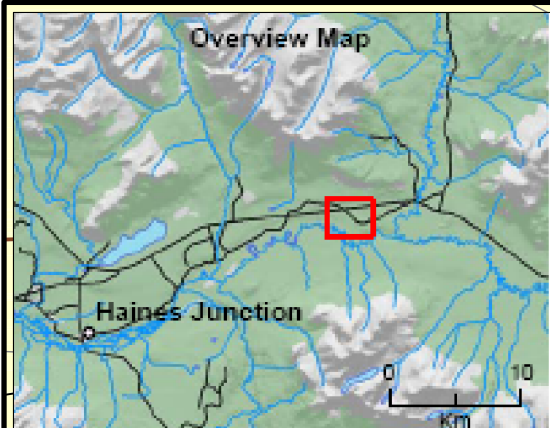
As per section 3.7 of the CATT ILP, visual concerns adjacent to the Alaska Highway have been addressed by leaving an un-harvested buffer. The minimum width for this area of interest is 80m.

SITE AND HARVEST PLAN

Other Values					
Fuel Abatement: This area is located in the <i>CATT ILP Forest Resource Management Zone</i> and <i>Landscape Fuel Abatement Subzone</i> . As such, it meets the management objectives of: <ol style="list-style-type: none"> 1. being a stand with >30% beetle attack. 2. having a size, shape and location that “enhances fuel discontinuity”. 3. has a stand structure that allows the implementation silviculture principles to reduce the fire hazard. 4. being close to the Alaska Highway and the communities of Haines Junction and Canyon. 					
7. SILVICULTURE SYSTEM DESCRIPTION					
STAND NUMBER	SILVICULTURE SYSTEM	SEASON	RATIONALE		
V17	Natural Shelterwood	Winter	Winter harvest is required due to very high soil compaction hazard.		
Dispersed Retention Leave Tree Specs					
For the V17 Type the target for dispersed retention will be to leave all Deciduous trees and all Non-beetle attacked spruce including as much of the advanced regeneration in the understory as possible. The minimum level of understory retention will be at least 50% of the pre-harvest stems per hectare.					
Special Management Zone Leave Tree Specs					
Not Applicable					
8. SOIL CONSERVATION					
ON BLOCK PERMANENT DISTURBANCE CALCULATION TAB					
Disturbance Type (Road/landing)	Identification (Name / Number)	Road Standard	Length (m)	Width (m)	Total Area L x W /10,000 (ha)
N/A	N/A	N/A	N/A	N/A	N/A
Road Area	Landing Area	Total Area	Block Gross Area	Block Net Area	% Disturb. Of Gross Area
N/A	N/A	N/A	N/A	N/A	No permanent roads or landings
Depth of LFH	Hazard Ratings			Permafrost or Frost Heaving	Proposed Harvest Season
	Compaction	Surface Erosion	Displacement		
4cm	Very High	Moderate	Low	No permafrost	Winter
Proportion of Temporary Access Within Net Area to be reforested (explain rehabilitation measures)					
The proportion of temporary access within the NAR will not exceed 10%. These roads and landings will be ripped (as needed) have organic debris scattered on top and planted or allowed to regenerate naturally as part of the NAR. Rehabilitation will be completed within three years of harvest.					
Fire Hazard Abatement (explain measures for slash abatement)					
The current fire hazard is high to extreme. Salvage harvesting and subsequent slash reduction will greatly reduce the potential fire hazard on this site.					
After harvest, excess slash accumulated at the landings (piles) will be burned within two years of harvest. Otherwise, dispersed slash will be left to contribute to Coarse Woody Debris, small fur-bearer habitat and act as a soil carbon and nutrient supply.					

SITE AND HARVEST PLAN

Forest Health (explain measures to reduce current and future risk of forest to disease and insects)								
This area has been severely attacked by spruce beetle (<i>Dendroctonus Rufipennis</i>). The proportion of merchantable stems that are attacked by beetles (Cruise Beetle Codes 5, 6 & 7) is 64%. Harvesting is prescribed to remove these trees and allow for planted and natural regeneration.								
Additional Comments								
9. REFORESTATION AND DESCRIPTION								
SIS #	Stand #	Net Area to Reforest (ha)	Restocking		Target Stocking (SPH)	Assessment Dates Delay to Treat	Regen Surveys	
			Pref Species	Acc Species			Early Stocking	Late Performance
	V17	176.5	Sw	At	1200	H+2	H+5	H+10
Reforestation Plan								
Natural regeneration supplemented with fill planting where necessary.								
Stand Number V17 may be left for up to two (2) years after harvest to facilitate establishment of natural regeneration. A regeneration survey should be conducted at this time and any areas found to be not satisfactorily restocked will be planted no later than four (4) years after harvest. The survey will also specify other remedial actions if necessary.								
Establishment to Assessment Date Concerns								
No Brushing concerns anticipated.								
Additional Comments								
FMB								
Approval by:				Date:				
Position:				Signature:				
10. ATTACHMENTS								
Site and Harvest Plan Map @ 1: 10,000								



**INTEGRATED LANDSCAPE PLAN
TIMBER HARVEST PROJECT**
CHAMPAGNE and AISHIHIK
TRADITIONAL TERRITORY
YUKON, CANADA

AREA 21
SITE AND HARVEST PLAN MAP
FMU: Y06
Eco-Region: Ruby Range / Southern Lakes
CATT ILP Zone: Forest Resource Management Zone
Sub Zone: Landscape Fuel Abatement
Latitude: 60° 50' 44.5" Longitude: 137° 08' 55.0"
NTS Map Sheet: 115 A
Base Map Information Localized

Area Summary			
Area of Interest			256.1
Landscape Buffers	Area ha	Internal Reserve and Natural NP	Area ha
Wildlife	10.7	Reserve	11.5
Riparian	0.0	Non Timber	0.0
Visual	29.9		
Other	27.5		
Gross Operable Area	188.0	Net Operable Area	176.5

Stand Number	Vegetation Type	Inventory Label	Harvest Season	Area ha
V17	V17	SW10-4B7M	W	176.5
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
Net Area to Reforest			Total	176.5

Cruise Information		
Timber Type	Net Operable Area (ha)	Net Available Volume (m3/ha)
All (V17)	All (V17)	13,423

Legend

Net Operable Area

Non Forested

White Spruce

1990-1999 Fires

Balsam Poplar

Trembling Aspen

Base Map

Highway

Limited Use Road

Pro Temp Rd(Class 4/5)

Loc Temp Rd(Class 2)

Logging Road

Contour (100ft)

Trail

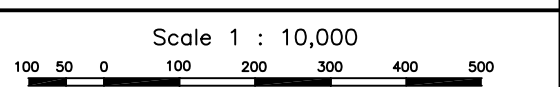
Cut Line

Watercourses

Wetland

Waterbody

Dry Riverbed/Sand



INDUSTRIAL FORESTRY SERVICE LTD.
1595 Fifth Avenue
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V2L 3L9
PH: (250) 564-4115 FAX: (250) 563-9679
Date Drawn: Feb 21/07
Date of Field Work: Summer 2007
IFS Job #: 070224
Contract #: FMB 07-01

FOREST MANAGEMENT BRANCH

SITE AND HARVEST PLAN

1. LOCATION								
District			Geographic Location Name				Mapsheet	
Kluane			Haines Junction Area				115A	
FMU			Latitude		Longitude		SIS#	
Y06			60° 49' 23.3"		137° 34' 04.4"			
Development Area			Block Number			Air Photo Numbers		
Pine Lake Landscape Unit			22			N/A		
2. ECOLOGY AND SITE CONDITION								
Eco-Region			Vegetation Type			Soil Type / Soil Texture		
Ruby Range / Southern Lakes			V17			S8-S10/Si-SiC-C-LS-S		
Elevation (m)	Slope (%)	Aspect	Terrain	Slope Position	Moist Regime	Soil Drainage	LFH Depth (cm)	NDZ
725-760	2	SW	Even	Level	Moist-Very Moist	ModWell-Imperfect	10	Simple Upland (3)
3. BLOCK AREA SUMMARY IN HECTARE								
Area of Interest (ha)	Wildlife Buffers (ha)	Riparian Buffers (ha)	Visual Buffers (ha)	Other Buffers (ha)	Reserve (ha)	Non Timber (ha)	Perm Roads Landings (ha)	Net Area to Reforest (ha)
362.0		4.0	2.3	84.2	14.4	1.4		255.7
4. HARVEST STAND DESCRIPTION								
Stand Number	Merch Area (ha)	Species	Crown Closure	Age (years)	Avg. Height (m)	Avg. DBH (cm)	Est. Vol/Ha (m³/ha)	
All (V17)	255.7	Sw10	12%	136	15.8	21.6	99	

SITE AND HARVEST PLAN

5. RIPARIAN MANAGEMENT					
Riparian ID#	Class (Stream Wetland Lake)	Reserve Zone Width (m)	Rationale For Reserve	Mngmt Zone Width (m)	Strategies for Management Zone
Un-named	Class 1 Wetland (<1ha.)	0	Habitat & Connectivity	60	No Harvest
Un-named	Class 3 Stream (1.5-5m wide)	40	Fish/Water & Connectivity	60	No Harvest
Riparian Comments : 1. Reserves and Management Zones are as per the <i>Timber Harvest Planning and Operating Guidebook</i> . 2. Riparian Features are the basis of the <i>CATT Habitat Connectivity Planning Recommendations</i> . 3. There are several small Class 1 wetlands within the reserve area at the west end of the block (not shown on map). Some random harvesting has already occurred within the Riparian Management Zone (RMZ) of some of these wetlands. Future harvesting operations will exclude the remainder of the RMZ.					
6. STAND MANAGEMENT OBJECTIVES					
HIGHER LEVEL AND OTHER PLANS					
This Site and Harvest Plan is consistent with: <ul style="list-style-type: none"> • The guiding principles of the <i>Strategic Forest Management Plan for the Champagne and Aishihik Traditional Territory (CATT)</i>, • The <i>CATT Integrated Landscape Plan</i> which defines the management priorities and guidelines for Timber Harvest Project Planning. And the <i>CATT Regional Timber Harvesting Project Within The Pine Lake and Canyon Landscape Units</i> which links the above Landscape Level Strategies, Management Priorities and Guidelines to this Stand Level Operational Plan.					
STAND-LEVEL OBJECTIVES					
Discuss non-timber values that may be affected by the proposed treatment and measures proposed to accommodate these Traditional or First Nations					
Consultation with CAFN citizens identified high potential for heritage resources. As per the <i>CATT ILP Heritage and Cultural Guidelines</i> (section 3.8), qualified Champagne and Aishihik personnel must conduct a pre-harvest field assessment. Some First Nations special sites are present in this area. They are located within the riparian, visual and other noted buffers and are excluded from the harvest area. If a previously unidentified cultural or heritage resource is encountered during the harvesting or road building operations, operations will cease to the extent necessary to ensure its protection until an assessment can be carried out.					

SITE AND HARVEST PLAN

Wildlife Values

As per the *CATT ILP Forest Ecosystems, Wildlife, and Biological Diversity Guidelines* (section 3.5) appropriate wildlife movement corridors have been maintained at the landscape level focusing on riparian management areas while stand level buffers, reserves and retention have are provided as on block elements to enhance and complement the landscape connectivity. In addition, there are no “Species at Risk” that will be adversely impacted by harvesting on this site.

This block is located within the *CATT ILP FRMZ High Wildlife Value Area*. Therefore all harvest blocks must average 25% retention of stand structure with a range of 10-30%. The total amount of retention in this block (Buffers, Reserves and dispersed leave trees) is 29% by volume.

This block meets all connectivity requirements outlined in the *Habitat Connectivity Planning Recommendations For Forest harvest Planning In The Champagne And Aishihik Traditional Territory*

Fish Water Values

As per the *CATT ILP Watershed and Riparian Management Guidelines* (section 3.6) the cumulative area of this and all other blocks in this landscape unit does not exceed 20% of the watershed area. In addition, the *THPOG* guidelines have been followed for all classified streams in or adjacent to this block (see section 5 *Riparian Management* of this S & HP). All streams encountered were defaulted to fish bearing.

Recr Visual Values

Private land is located directly to the southwest of this block. A 100m visual buffer is provided to reduce visual impacts.

Other Values

Other Tenures:

One or more active tenures exist in this area for firewood and other products. These tenures should be accounted for in the overall harvest strategy for this area. Given that the current harvested areas retain 40m³/ha of merchantable beetle infested timber, it is suggested that tenure holders be encouraged to remove all infested trees and windthrow. (i.e. discourage futile attempts at selective logging over large areas).

The holder of a trapline concession in this area should be contacted for input prior to harvest activities commencing.

Fuel Abatement:

This area is located in the *CATT ILP Forest Resource Management Zone* and *Landscape Fuel Abatement Subzone*. As such, it meets the management objectives of:

1. being a stand with >30% beetle attack.
2. having a size, shape and location that “enhances fuel discontinuity”.
3. has a stand structure that allows the implementation silviculture principles to reduce the fire hazard.
4. being close to the Alaska Highway and the communities of Haines Junction and Canyon.

7. SILVICULTURE SYSTEM DESCRIPTION

STAND NUMBER	SILVICULTURE SYSTEM	SEASON	RATIONALE
V17	Natural Shelterwood	Winter	Winter harvest is required due to very high soil compaction hazard.

Dispersed Retention Leave Tree Specs

For the **V17 Type** the target for dispersed retention will be to leave all Deciduous trees and all Non-beetle attacked spruce including as much of the advanced regeneration in the understory as possible. The minimum level of understory retention will be at least 50% of the pre-harvest stems per hectare.

SITE AND HARVEST PLAN

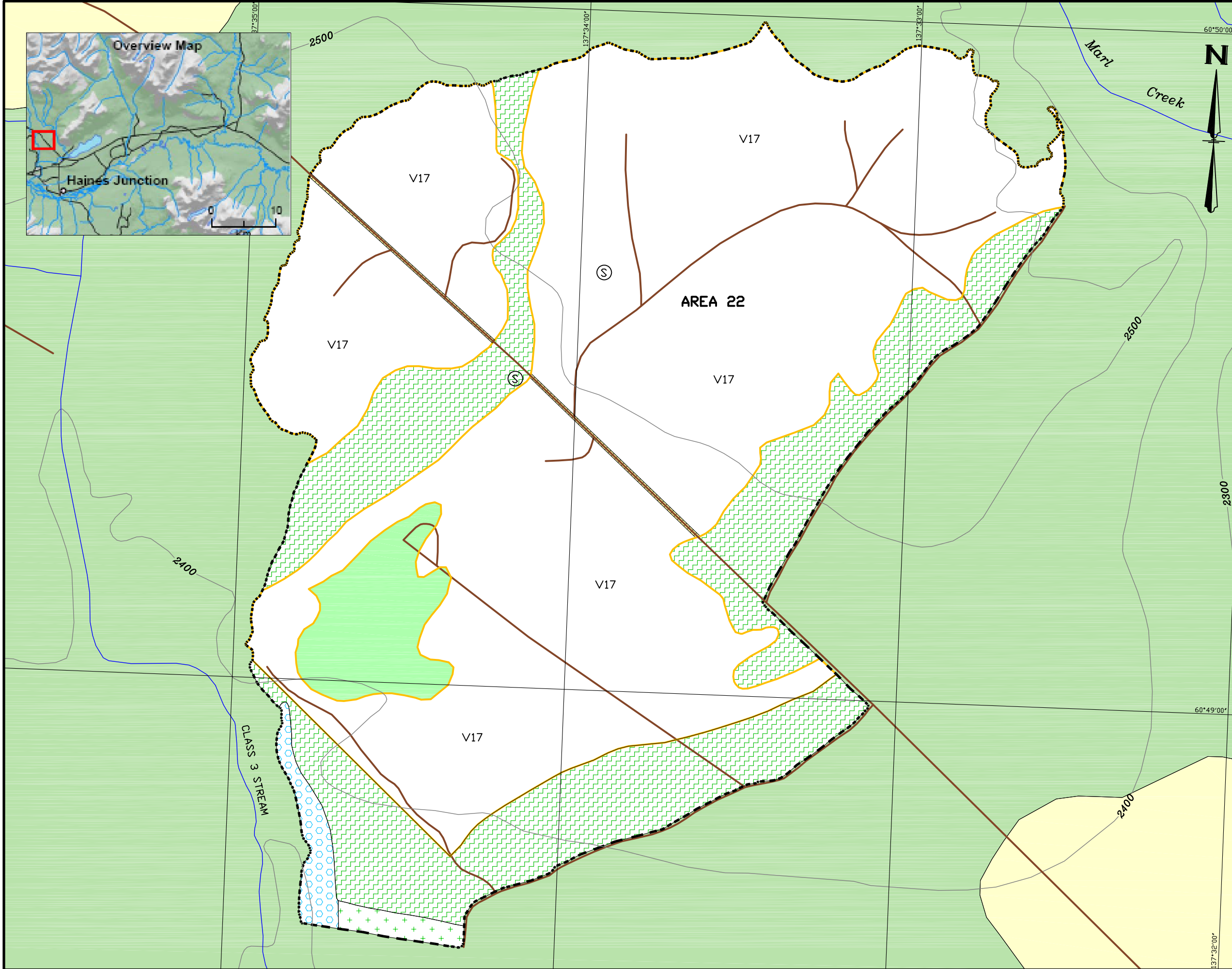
Special Management Zone Leave Tree Specs
Not Applicable

8. SOIL CONSERVATION

ON BLOCK PERMANENT DISTURBANCE CALCULATION TAB					
Disturbance Type (Road/landing)	Identification (Name / Number)	Road Standard	Length (m)	Width (m)	Total Area L x W /10,000 (ha)
N/A	N/A	N/A	N/A	N/A	N/A
Road Area	Landing Area	Total Area	Block Gross Area	Block Net Area	% Disturb. Of Gross Area
N/A	N/A	N/A	N/A	N/A	No permanent roads or landings
Depth of LFH	Hazard Ratings			Permafrost or Frost Heaving	Proposed Harvest Season
	Compaction	Surface Erosion	Displacement		
10cm	High to Very High	Moderate	Low to Moderate	No permafrost	Winter
Proportion of Temporary Access Within Net Area to be reforested (explain rehabilitation measures)					
The proportion of temporary access within the NAR will not exceed 10%. These roads and landings will be ripped (as needed) have organic debris scattered on top and planted or allowed to regenerate naturally as part of the NAR. Rehabilitation will be completed within three years of harvest.					
Fire Hazard Abatement (explain measures for slash abatement)					
The current fire hazard is high to extreme. Salvage harvesting and subsequent slash reduction will greatly reduce the potential fire hazard on this site.					
After harvest, excess slash accumulated at the landings (piles) will be burned within two years of harvest. Otherwise, dispersed slash will be left to contribute to Coarse Woody Debris, small fur-bearer habitat and act as a soil carbon and nutrient supply.					
Forest Health (explain measures to reduce current and future risk of forest to disease and insects)					
This area has been severely attacked by spruce beetle (<i>Dendroctonus Rufipennis</i>). The proportion of merchantable stems that are attacked by beetles (Cruise Beetle Codes 5, 6 & 7) is 82%. Harvesting is prescribed to remove these trees and allow for planted and natural regeneration.					
Additional Comments					

SITE AND HARVEST PLAN

9. REFORESTATION AND DESCRIPTION								
SIS #	Stand #	Net Area to Reforest (ha)	Restocking		Target Stocking (SPH)	Assessment Dates Delay to Treat	Regen Surveys	
			Pref Species	Acc Species			Early Stocking	Late Performance
	V17	255.7	Sw	At	1200	H+2	H+5	H+10
Reforestation Plan								
<p>Natural regeneration supplemented with fill planting where necessary.</p> <p>Stand Number V17 may be left for up to two (2) years after harvest to facilitate establishment of natural regeneration. A regeneration survey should be conducted at this time and any areas found to be not satisfactorily restocked will be planted no later than four (4) years after harvest. The survey will also specify other remedial actions if necessary.</p>								
Establishment to Assessment Date Concerns								
No Brushing concerns anticipated.								
Additional Comments								
FMB								
Approval by:				Date:				
Position:				Signature:				
10. ATTACHMENTS								
Site and Harvest Plan Map @ 1: <u>10,000</u>								



**INTEGRATED LANDSCAPE PLAN
TIMBER HARVEST PROJECT**

CHAMPAGNE and AISHIHIK
TRADITIONAL TERRITORY
YUKON, CANADA

**AREA 22
SITE AND HARVEST PLAN MAP**

FMU: Y06
Eco-Region: Ruby Range / Southern Lakes
CATT ILP Zone: Forest Resource Mangement Zone
Sub Zone: Landscape Fuel Abatement
Latitude: 60° 47' 08.4" Longitude: 137° 38' 24.7"
NTS Map Sheet: 115 A
Base Map Information Localized

Area Summary

Area of Interest		362.0	
Landscape Buffers	Area ha	Internal Reserve and Natural NP	Area ha
Wildlife	0.0	Reserve	14.4
Riparian	4.0	Non Timber	1.4
Visual	2.3		
Other	84.2		
Gross Operable Area	271.5	Net Operable Area	255.7

Stand Number	Vegetation Type	Inventory Label	Harvest Season	Area ha
V17	V17	SW10-4A6M	W	255.7
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
Net Area to Reforest			Total	255.7

Cruise Information

Timber Type	Net Operable Area (ha)	Net Available Volume (m3/ha)
All (V17)	All (V17)	25,385

Legend

- Net Operable Area

Non Forested

White Spruce
- 1990-1999 Fires

Balsam Poplar

Trembling Aspen
- Base Map

Highway

Limited Use Road

Pro Temp Rd(Class 4/5)

Loc Temp Rd(Class 2)

Logging Road

Contour (100ft)

Trail

Cut Line

Watercourses

Wetland

Waterbody

Dry Riverbed/Sand

Scale 1 : 10,000



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Date Drawn: Feb 21/07
Date of Field Work: Summer 2007
IFS Job #: 070224
Contract #: FMB 07-01

FOREST MANAGEMENT BRANCH

SITE AND HARVEST PLAN

1. LOCATION								
District			Geographic Location Name				Mapsheet	
Kluane			Haines Junction Area				115A	
FMU			Latitude		Longitude		SIS#	
Y06			60° 47' 51.5"		137° 26' 34.3"			
Development Area			Block Number			Air Photo Numbers		
Pine Lake Landscape Unit			26			N/A		
2. ECOLOGY AND SITE CONDITION								
Eco-Region			Vegetation Type			Soil Type / Soil Texture		
Ruby Range / Southern Lakes			V17			S5/CL-SCL		
Elevation (m)	Slope (%)	Aspect	Terrain	Slope Position	Moist Regime	Soil Drainage	LFH Depth (cm)	NDZ
670	5	Flat	Even	Level	Fresh	Well	6	Simple Upland (3)
3. BLOCK AREA SUMMARY IN HECTARE								
Area of Interest (ha)	Wildlife Buffers (ha)	Riparian Buffers (ha)	Visual Buffers (ha)	Other Buffers (ha)	Reserve (ha)	Non Timber (ha)	Perm Roads Landings (ha)	Net Area to Reforest (ha)
89.7	10.7			22.8	2.1			54.1
4. HARVEST STAND DESCRIPTION								
Stand Number	Merch Area (ha)	Species	Crown Closure	Age (years)	Avg. Height (m)	Avg. DBH (cm)	Est. Vol/Ha (m³/ha)	
All (V17)	54.1	Sw10	25%	188	14.9	17.1	106	
5. RIPARIAN MANAGEMENT								
Riparian ID#	Class (Stream Wetland Lake)	Reserve Zone Width (m)	Rationale For Reserve	Mngmt Zone Width (m)	Strategies for Management Zone			
N/A	N/A	N/A	N/A	N/A	N/A			
Riparian Comments :								
1. Reserves and Management Zones are as per the <i>Timber Harvest Planning and Operating Guidebook</i> .								
2. Riparian Features are the basis of the <i>CATT Habitat Connectivity Planning Recommendations</i> .								

SITE AND HARVEST PLAN

6. STAND MANAGEMENT OBJECTIVES

HIGHER LEVEL AND OTHER PLANS

This Site and Harvest Plan is consistent with:

- The guiding principles of the *Strategic Forest Management Plan for the Champagne and Aishihik Traditional Territory (CATT)*,
- The *CATT Integrated Landscape Plan* which defines the management priorities and guidelines for Timber Harvest Project Planning.
- And the *CATT Regional Timber Harvesting Project Within The Pine Lake and Canyon Landscape Units* which links the above Landscape Level Strategies, Management Priorities and Guidelines to this Stand Level Operational Plan.

STAND-LEVEL OBJECTIVES

Discuss non-timber values that may be affected by the proposed treatment and measures proposed to accommodate these Traditional or First Nations

As per the *CATT ILP Heritage and Cultural Guidelines* (section 3.8). Qualified Champagne and Aishihik personnel must conduct a pre-harvest field assessment.

No potential cultural or heritage resource features were noted within the harvest area during the reconnaissance and cruising phases.

If a previously unidentified cultural or heritage resource is encountered during the harvesting or road building operations, operations will cease to the extent necessary to ensure its protection until an assessment can be carried out.

Wildlife Values

As per the *CATT ILP Forest Ecosystems, Wildlife, and Biological Diversity Guidelines* (section 3.5) appropriate wildlife movement corridors have been maintained at the landscape level focusing on riparian management areas while stand level buffers, reserves and retention have are provided as on block elements to enhance and complement the landscape connectivity. In addition, there are no “Species at Risk” that will be adversely impacted by harvesting on this site.

This block is located within the *CATT ILP FRMZ High Wildlife Value Area*. Therefore all harvest blocks must average 25% retention of stand structure with a range of 10-30%. The total amount of retention in this block (Buffers, Reserves and dispersed leave trees) is 46% by volume.

As per the *Best Management Practices For Northern Goshawk Habitat In The Yukon Territory* any large stick nests found were buffered from harvest by a minimum 200m no-harvest zone connected to the outside of the harvest area. The current rating is high due to the 25% CC, however the crown closure is declining rapidly as more trees die and fall over.

This block meets all connectivity requirements outlined in the *Habitat Connectivity Planning Recommendations For Forest harvest Planning In The Champagne And Aishihik Traditional Territory*

Fish Water Values

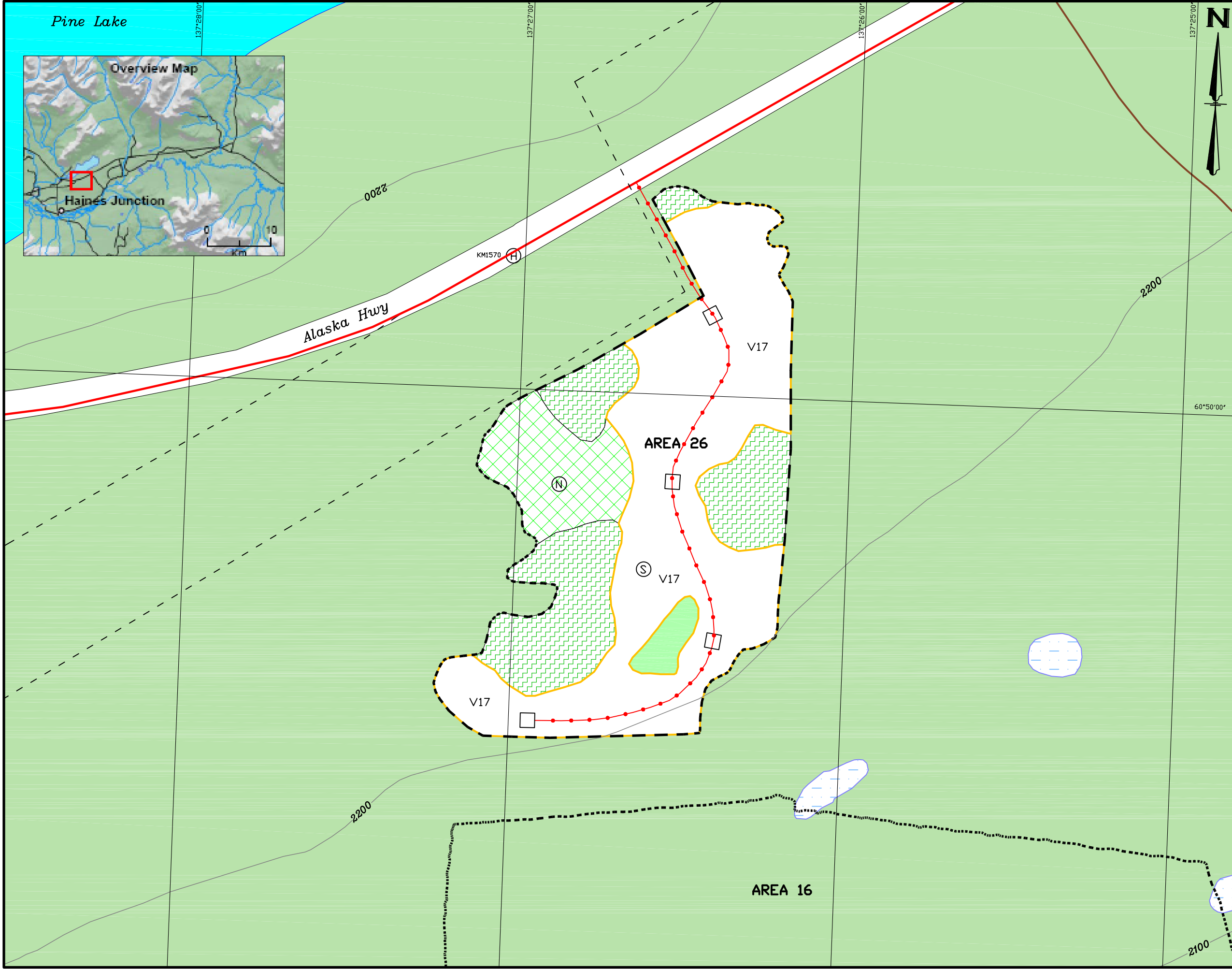
As per the *CATT ILP Watershed and Riparian Management Guidelines* (section 3.6) the cumulative area of this and all other blocks in this landscape unit does not exceed 20% of the watershed area. In addition, the *THPOG* guidelines have been followed for all classified streams in or adjacent to this block (see section 5 *Riparian Management* of this S&HP). All streams encountered were defaulted to fish bearing.

SITE AND HARVEST PLAN

Recr Visual Values					
As per section 3.7 of the CATT ILP, visual concerns adjacent to the Alaska Highway have been addressed by leaving an un-harvested buffer. The minimum width for this area of interest is 110m.					
Other Values					
Fuel Abatement: This area is located in the <i>CATT ILP Forest Resource Management Zone</i> and <i>Landscape Fuel Abatement Subzone</i> . As such, it meets the management objectives of: <ol style="list-style-type: none"> 1. being a stand with >30% beetle attack. 2. having a size, shape and location that “enhances fuel discontinuity”. 3. has a stand structure that allows the implementation silviculture principles to reduce the fire hazard. 4. being close to the Alaska Highway and the communities of Haines Junction and Canyon. 					
7. SILVICULTURE SYSTEM DESCRIPTION					
STAND NUMBER	SILVICULTURE SYSTEM	SEASON	RATIONALE		
V17	Natural Shelterwood	Winter	Winter harvest is required due to very high soil compaction hazard.		
Dispersed Retention Leave Tree Specs					
For the V17 Type the target for dispersed retention will be to leave all Deciduous trees and all Non-beetle attacked spruce including as much of the advanced regeneration in the understory as possible. The minimum level of understory retention will be at least 50% of the pre-harvest stems per hectare.					
Special Management Zone Leave Tree Specs					
Not Applicable					
8. SOIL CONSERVATION					
ON BLOCK PERMANENT DISTURBANCE CALCULATION TAB					
Disturbance Type (Road/landing)	Identification (Name / Number)	Road Standard	Length (m)	Width (m)	Total Area L x W /10,000 (ha)
N/A	N/A	N/A	N/A	N/A	N/A
Road Area	Landing Area	Total Area	Block Gross Area	Block Net Area	% Disturb. Of Gross Area
N/A	N/A	N/A	N/A	N/A	No permanent roads or landings
Depth of LFH	Hazard Ratings			Permafrost or Frost Heaving	Proposed Harvest Season
	Compaction	Surface Erosion	Displacement		
6cm	Very High	Moderate	Moderate	No permafrost	Winter
Proportion of Temporary Access Within Net Area to be reforested (explain rehabilitation measures)					
The proportion of temporary access within the NAR will not exceed 10%. These roads and landings will be ripped (as needed) have organic debris scattered on top and planted or allowed to regenerate naturally as part of the NAR. Rehabilitation will be completed within three years of harvest.					
Fire Hazard Abatement (explain measures for slash abatement)					
The current fire hazard is high to extreme. Salvage harvesting and subsequent slash reduction will greatly reduce the potential fire hazard on this site.					
After harvest, excess slash accumulated at the landings (piles) will be burned within two years of harvest. Otherwise, dispersed slash will be left to contribute to Coarse Woody Debris, small fur-bearer habitat and act as a soil carbon and nutrient supply.					

SITE AND HARVEST PLAN

Forest Health (explain measures to reduce current and future risk of forest to disease and insects)								
This area has been severely attacked by spruce beetle (<i>Dendroctonus Rufipennis</i>). The proportion of merchantable stems that are attacked by beetles (Cruise Beetle Codes 5, 6 & 7) is 75%. Harvesting is prescribed to remove these trees and allow for planted and natural regeneration.								
Additional Comments								
9. REFORESTATION AND DESCRIPTION								
SIS #	Stand #	Net Area to Reforest (ha)	Restocking		Target Stocking (SPH)	Assessment Dates Delay to Treat	Regen Surveys	
			Pref Species	Acc Species			Early Stocking	Late Performance
	V17	54.1	Sw	At	1200	H+2	H+5	H+10
Reforestation Plan								
Natural regeneration supplemented with fill planting where necessary.								
Stand Number V17 may be left for up to two (2) years after harvest to facilitate establishment of natural regeneration. A regeneration survey should be conducted at this time and any areas found to be not satisfactorily restocked will be planted no later than four (4) years after harvest. The survey will also specify other remedial actions if necessary.								
Establishment to Assessment Date Concerns								
No Brushing concerns anticipated.								
Additional Comments								
FMB								
Approval by:				Date:				
Position:				Signature:				
10. ATTACHMENTS								
Site and Harvest Plan Map @ 1: 10,000								



INTEGRATED LANDSCAPE PLAN TIMBER HARVEST PROJECT

CHAMPAGNE and AISHIHIK
TRADITIONAL TERRITORY
YUKON, CANADA

AREA 26

SITE AND HARVEST PLAN MAP

FMU: Y06
Eco-Region: Ruby Range / Southern Lakes
CATT ILP Zone: Forest Resource Mangement Zone
Sub Zone: Landscape Fuel Abatement
Latitude: 60° 47' 51.5" Longitude: 137° 26' 34.3"
NTS Map Sheet: 115 A
Base Map Information Localized

Area Summary

Area of Interest		89.7	
Landscape Buffers	Area ha	Internal Reserve and Natural NP	Area ha
Wildlife	10.7	Reserve	2.1
Riparian	0.0	Non Timber	0.0
Visual	0.0		
Other	22.8		
Gross Operable Area	56.2	Net Operable Area	54.1

Stand Number	Vegetation Type	Inventory Label	Harvest Season	Area ha
V17	V17	SW10-4B8M	W	54.1
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
Net Area to Reforest			Total	54.1

Cruise Information

Timber Type	Net Operable Area (ha)	Net Available Volume (m3/ha)
All (V17)	All (V17)	5,739

Legend

- Net Operable Area
- Non Forested
- White Spruce
- 1990-1999 Fires
- Balsam Poplar
- Trembling Aspen

- Base Map
- Highway
- Limited Use Road
- Pro Temp Rd(Class 4/5)
- Loc Temp Rd(Class 2)
- Logging Road
- Contour (100ft)
- Trail
- Cut Line
- Watercourses
- Wetland
- Waterbody
- Dry Riverbed/Sand

Scale 1 : 10,000



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APPENDIX C

OPERATIONAL STUDY TRIALS

- Study Design for Summer/Winter Harvest Operational Trial
- Study Design for Site Preparation Operational Trial
- Study Design for Understory Retention Operational Trial

Study Design
Summer/Winter Harvest Operational Trial
CATT Timber Harvest Project

Draft date: May 15, 2008
Prepared by: Aynslie Ogden

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1.0 Introduction

In the Yukon, harvesting is commonly prescribed to take place during the winter months when the ground is frozen. Harvesting in the winter is prescribed for a variety of reasons including a desire to minimize soil disturbance (particularly on wet sites) and/or to enable access to a harvest block via a winter road. Summer harvesting is also prescribed but more to a limited extent; where it is prescribed it tends to be on drier sites.

Some concerns have been raised about the potential negative impact of winter harvesting on the time it takes to establish a free-to-grow stand. When winter harvesting is combined with a prescription for natural regeneration following harvest, some local forest practitioners have theorized that this may result in significant regeneration lags since regeneration may be delayed by a thick moss layer on these sites. Regeneration delays will delay green-up, extend impacts of harvested areas on visual quality, affect long-term timber supply and may have an affect on wildlife and hydrological responses, among other considerations. Some theorize that summer harvesting practices may facilitate a reduction in this thick moss layer, expose more mineral soil and increase soil temperatures thereby creating more favorable growing sites which in turn increases the growth and survival rates of conifer seedlings. On the other hand, disturbing the moss layer – an important storehouse of soil nutrients and soil carbon – may affect long-term site productivity and carbon balance of a site.

While some experiential knowledge exists amongst the community of forest practitioners working in the Yukon, very little formal research has been conducted here on relationship between summer / winter harvesting, natural regeneration, soil disturbance, long term site productivity, carbon balance, and wildlife response. Therefore, there is an opportunity to conduct research to explore these relationships to provide guidance on when, where and how to prescribe winter and summer harvesting treatments.

The purpose of this study is to establish an active adaptive management experiment to compare levels of soil disturbance and natural regeneration, particularly the growth and survival of conifer seedlings, on summer and winter harvested areas in the Champagne and Aishihik Traditional Territory. This research will help to inform the development of best management practices.

2.0 Background

The CATT SFMP requires the development and implementation of an adaptive management framework with a clear methodology and consistent procedures that can be replicated over time to provide comparison of results and changes. The plan defines adaptive management as “a dynamic approach to forest management in which the effects of treatments and decisions are continually monitored and used, with research results, to modify management practices on a continuing basis to ensure that management objectives are being met.” An important component of this feedback is an objective and research-based examination of key management assumptions, on-the-ground outcomes, and future projections of short and long-term actions. There are two kinds of adaptive management, active and passive.

Active adaptive management is a systematic process of modeling, experimentation, and monitoring to compare the outcomes of alternative management actions. Passive adaptive management is a more formal approach by which historical information is explicitly used to select what is thought to be the single best management policy. Ecosystem response to the policy is observed, and the policy is adapted accordingly. A major drawback of passive adaptive management is that it confounds environmental and anthropogenic effects because replicates and controls are not utilized. This often leads to conflict over whether ecological responses are due to environmental or anthropogenic effects (AME Team, 2008).

To assist in the development and implementation of an adaptive management framework, the Forestry Working Group tasked the Research and Monitoring Group (RMTWG) in April 2007 to address immediate opportunities to incorporate ‘active adaptive’ management experiments into the 2008 Timber Harvest Project (THP). This study is one of several such studies. The studies that were selected to be included in this THP were identified using the following criteria:

- 1) **Research questions that lend themselves to study through an active adaptive management experiment.** Operational trials (if properly designed) are good examples of active adaptive management experiments. Such trials enable a deliberate testing of alternative management policies or treatments and may be set up to provide information about the response of indicators (measurable characteristic of the system used to evaluate the outcome of management actions) to the alternative treatments.
- 2) **A need has been demonstrated for this operational trial either through the SFMP, ILP, community consultations or other research underway in the region.** The need for a study on the effectiveness or impact of winter vs. summer harvesting was raised by members of the Research and Monitoring Technical Working Group (RMTWG 2007); and in a recent series of forest practitioner focus groups (Ogden and Innes, 2008).
- 3) **Using the criteria outlined in Gregory *et al.* (2007), there are no significant impediments to proceeding with a comprehensive, active, adaptive management approach involving a statistically sound experimental trial.** These criteria include: the spatial extent or complexity of the problem is not too large, in other words, an experimental design that has fewer variables is easier to implement per the principles of experimental design (see Section 6.1) than a study involving multiple variables (in this study, two variables (e.g. site preparation and planting) are proposed for study); the study has been pared down to focus on uncertainties that, if resolved, are likely to influence management decisions; costs and benefits of the study can be documented and communicated in a manner that is understandable to all stakeholders; the study design does not involve any trade-offs that might be considered taboo by some stakeholders; there is sufficient management flexibility to incorporate new information arising from the experiment into management plans and practices and lastly, that there are sufficient analytical skills available to design, evaluate and monitor the experiment.

3.0 Study Area

In selecting a suitable location for this study, we considered two blocks in the THP – one that falls within the existing 4900 ha Forestry Reserve near Marshall Creek and one block immediately adjacent to it. This reserve was established in 1987 and is officially designated as a Forestry Reserve under the Lands Act.¹ The 2008 CATT Timber Harvest Project identifies six harvest blocks within this Reserve – blocks 13b, 14, 15, 17, 18 and 19 with area 13 lying just outside the reserve boundary. See map in Appendix A and summary of ecological and soil characteristics in Appendix B.

This study consists of one trial replicated on two areas. Area 13 will be on a wetter (moist) site. Area 13B will be on a drier (fresh) site. To be able to test for the effect of each treatment, there is a need to control variables other than the treatment itself. Within a harvest area, stand conditions prior to harvest, harvest techniques, soil and terrain characteristics including aspect, elevation, slope, site position, terrain, moisture and nutrient regime need to be the same. To facilitate comparisons between the areas all of the same variables should be similar other than soil moisture regime. We also wanted to select a site that within the realm of being appropriate to prescribe for summer or winter harvesting (e.g. wet sites were not considered). Because the summer harvesting component of this trial involves some soil disturbance, we also wanted to select a harvest area with no potential for heritage resources. In selecting the harvest area for this trial we also considered issues of competing vegetation. We also wanted to select harvest areas that are in an accessible location to enable regular visits to the area for re-measurement or demonstration, and are not anticipated to have incompatible post-harvest uses.

For the **moist site** we selected Area 13 for the following reasons.

- Located in the forestry reserve
- Accessed via the same proposed main road as 13B allowing one contractor to efficiently harvest both areas
- Soil conditions meet the “wet” summer harvest criteria, but is dry enough and has sufficient coarse fragments to prevent severe site degradation if summer harvested with low ground pressure (LGP) equipment. Low ground pressure equipment is classified as having less than 6 psi bearing pressure.
- Is a small enough area to allow the treatment of the entire area in four equal portions
- Relatively uniform site conditions throughout the trial area

¹ A Reserve may allow for use of the land, provide specific conditions of use and a time frame. Prior to activity on the land a land use permit may be required. Reserves can have development of a permanent or minor improvement. Reserved lands can contain lands that are unsurveyed, surveyed, titled to government or untitled. However, a Reserve does not give tenure to the land and is not considered a disposition. Reserve requests are reviewed through the regular land application process which ensures public, First Nation, municipal and departmental reviews of the request. Establishment of the reserve in the name of a particular department does not, initially, authorize physical development of the site. Further environmental assessment and mitigation may be required as a prelude to actual development. *Source: Lands Branch Fact Sheet on Reserves and Notations.*

For the **fresh site** we selected Area 13B for the following reasons:

- Located in the forestry reserve
- Accessed via the same proposed main road as 13 allowing one contractor to efficiently harvest both areas
- Soil conditions meet the “dry” summer harvest criteria, but is dry enough and has sufficient coarse fragments to prevent severe site degradation if summer harvested with low ground pressure (LGP) equipment. Low ground pressure equipment is classified as having less than 6 psi bearing pressure.
- Is a small enough area to allow the treatment of the entire area in four equal portions
- Relatively uniform site conditions throughout the trial area

Since Area 13 and Area 13B have similar site conditions other than soil moisture regime, it will be possible to make comparisons between the two trials.

4.0 Research Goal and Objectives

4.1 Goal:

The goal of this research project is to establish an active adaptive management experiment to compare levels of soil disturbance and natural regeneration, particularly the growth and survival of conifer seedlings, on summer and winter harvested areas in the Champagne and Aishihik Traditional Territory.

4.2 Objectives:

1. To document and monitor and compare changes in the growth and survival of planted conifer seedlings and naturally regenerated conifer seedlings on areas harvested in the summer and in the winter.
2. To provide a demonstration of winter and summer harvesting
3. To assess the economic feasibility of winter and summer harvesting
4. To support future decision-making on the application of winter and summer harvesting (e.g. to document effects of alternative management practices to support identification of best management practices)
5. To maximize opportunities to share results/findings.
6. To pilot test a study design for potential application elsewhere in the Yukon.

5.0 Research Questions and Hypotheses

Before carrying out a statistical analysis and establishing a study design, it is essential to have a precise statement of research questions and hypotheses to be tested. The null hypothesis, H_0 is usually a statement of no effect, no difference or no relationship. This study has the following research questions and hypotheses:

5.1 Does the harvesting season have an effect on the growth and survival of naturally regenerated conifer seedlings?

H_0 : Harvesting season has no effect on survival and growth of naturally regenerated conifer seedlings

H_1 : Harvesting season has an effect on survival and growth of naturally regenerated conifer seedlings

5.2 Does the harvesting season have an effect on the growth and survival of planted conifer seedlings?

H_0 : Harvesting season has no effect on survival and growth of planted conifer seedlings

H_1 : Harvesting season has an effect on survival and growth of planted conifer seedlings

5.3 Does the harvesting season have an effect on levels of soil disturbance within a harvest area?

H_0 : Harvesting season has no effect on levels of soil disturbance within a harvest area

H_1 : Harvesting season has an effect on levels of soil disturbance within a harvest area

5.4 Does the harvesting season have an effect on long-term site productivity?

H_0 : Harvesting season has no effect on long-term site productivity

H_1 : Harvesting season has an effect on long-term site productivity

5.5 Does the harvesting season have an effect on carbon balance?

H_0 : Harvesting season has no effect on carbon balance

H_1 : Harvesting season has an effect on carbon balance

5.6 Does the harvesting season have an effect on use of an area post-harvest by wildlife?

H_0 : Harvesting season has no effect on the use of an area post-harvest by wildlife

H_1 : Harvesting season has an effect on the use of an area post-harvest by wildlife

For 5.3 to 5.6 we will also examine if there is a combined effect of harvesting season and planting on level of soil disturbance, long-term site productivity, carbon balance and use of an area post-harvest by wildlife.

6.0 Experimental Design

6.1 Four principles of experimental design

This study adheres to the four principles of experimental design (DeVeaux *et al.*, 2008):

6.1.1 Principle 1: Control

All sources of variation other than the factors we are testing for are controlled by making conditions as similar as possible for all treatment types. We control other sources of variation to prevent them from changing and affecting the response variable.

6.1.2 Principle 2: Randomize

Randomization allows us to equalize the effects of unknown or uncontrollable sources of variation. It does not eliminate the effects of these sources, but it spreads them out across the treatment levels so that we can see past them. If the experimental units are not assigned to treatments at random, it will not be possible to use the powerful methods of statistics to draw conclusions from the study. “Control what you can, and randomize the rest”.

6.1.3 Principle 3: Replicate

Two kinds of replication show up in comparative experiments. First, we should have replication within an experiment. Only with such replication can we estimate the variability of responses. If we have not assessed variation, the experiment is not complete. A second kind of replication, to replicate an entire experiment (e.g. in a different treatment location) is also important to enable broader conclusions to be made. This kind of replication will not be explored in this study but is proposed for a subsequent Phase.

6.1.4 Principle 4: Block

The ability to randomize to equalize variation across treatment groups works best in the long run. Sometimes, attributes of the experimental units that we are not studying and that we can't control may nevertheless affect the outcomes of an experiment (for example, soil nutrient regime). By identifying these as blocks and then randomizing within each of these blocks, we can remove much of the variability due to difference among the blocks. Blocking is an important compromise between randomization and control. Blocking is only required in an experimental design when the site-specific conditions dictate it as being necessary to do so.

6.2 Two-Way Analysis of Variance Design

6.2.1 Two-Way Analysis of Variance Design

This study involves a series of treatments with replicates and control areas. The study is designed to test effects of treatments individually and together. Therefore, a completely randomized two-way analysis of variance study design is proposed. In ANOVA terminology, there is one factor in the design. There are two levels for this factor: summer harvest and winter harvest. The experiment consists of the following four treatments:

Treatment A – Control (winter harvest, not planted)

Treatment B – Summer harvest, not planted

Treatment C – Winter harvest, planted

Treatment D – Summer harvest, planted

6.2.2 Control, Randomize, Replicate, Block

It is important that the design be balanced – there must be an equal number of plots per treatment type. The block is divided into four plots, one plot for each treatment type. The location of the treatments is completely randomized in each block. The block is replicated two times on sites with different soil moisture conditions). See Figure 1.

If a block is not a homogenous unit (for example, if there is a slope, moisture or fertility gradient in the block), the study design should be altered from a completely randomized design to a randomized block design. In a randomized block design, the block would be divided into rows. The rows themselves should be homogenous within each row and different across the rows. The treatments would then be randomized in each row.

6.2.5 Repeated Measures Design

Repeated measurements will be taken on the following time schedule: at the start of the experiment; one growing season later; two growing seasons later; five growing seasons later; ten growing seasons later; every ten growing seasons following to stand age 50.

6.2.6 Sample Size

The sampling unit is a single tree within each subplot. Sample size must be sufficiently large to ensure that any treatment effect of practical significance has a high probability of detection.

6.2.7 Size of Plots

It is important that the design be balanced – plots must be of similar size (each area will be divided into four plots of approximately equal area).

Figure 1: Experimental Design of Summer/Winter Harvest Trial
(Note: Treatments will be randomly assigned in each block)

Area 13: Moist (wetter) site

Treatment A (Control) Winter harvest Not planted	Treatment D Summer harvest Planted
Treatment B Summer harvest Not planted	Treatment C Winter harvest Planted

Area 13B: Fresh (drier) site

Treatment B Summer harvest Not planted	Treatment A (Control) Winter harvest Not planted
Treatment D Summer harvest Planted	Treatment C Winter harvest Planted

7.0 Installing the Trial

7.1 Pre-Treatment Measurements

Pre-treatment measurements need to determine if the block is not a homogenous unit (for example, if there is a slope, moisture or fertility gradient). If there is, the study design will need to be a randomized block design and the design should be divided into three rows. The rows themselves should be homogenous within each row and different across the rows and the treatments should be randomized in each row. To assess the homogeneity of the block, detailed plots per the protocols outlined in the Yukon Forestry Field Manual and Monitoring Protocols (FMB, 2008) will be installed at a regular spacing throughout the block. It is particularly important to carry out a pre-harvest assessment of understory regeneration (all non-beetle attacked trees) at intensity of about one 50m² sample per one hectare (3.99m radius sample size on a 100m x 100m grid).

7.2 Marking the site

The corners of the each block will be staked and the GPS coordinates noted. Each plot within the block should also have the corner staked, and a stake with the treatment type should be placed in the centre of each plot. In addition, boundaries of each treatment units will be ribboned and GPS traversed.

7.3 Treatments

7.3.1 Summer and Winter Harvesting

- All-weather road access will be located to facilitate easy harvest layout and seasonal treatments
- Summer harvesting will be in the late part of the summer when conditions are the driest (July to September).
- Winter harvesting will be in the early part of the winter as soon as the ground is sufficiently frozen.
- The late summer – early winter schedule allows the contractor to park his equipment on site during the freeze up period, thus reducing overall staging costs.
- The Site and Harvest Plan (S&HP) will reference this Study for details of harvest layout and execution
- Daily harvest supervision by FMB staff familiar with the objectives of this research is required
- Harvest / regeneration method is dictated by each treatment unit requirements (Specified as separate units on the S&HP map).
- Harvest equipment is expected to be Feller-Buncher and Grapple Skidder for all treatments.
- To ensure that treatment objectives are met, a specific contract should be developed for both Areas 13 and 13B with a single contractor.
- The harvest areas (Areas 13 and 13B) have been chosen to minimize impacts on other resource values and the S&HP will describe any potential concerns relative to the guiding CATT ILP document.

7.3.2 Planting

At the start of the experiment, each naturally regenerated tree in each plot will be tagged. In the planted plots, naturally regenerated trees and planted trees will be tagged and for each their origin noted. At the start of the experiment, all plots will be surveyed for regeneration, and planted plots will be planted to a maximum density of 25 trees per 12.5m x 12.5m plot (including natural regeneration). The additional plot measurements noted above should also be recorded. Digital photos of each plot should be taken.

- If not already in storage, sufficient seeds should be collected from the Haines Junction area at least two years before harvest to allow time to grow planting stock for the treatment areas.

- Planting should be carried out during the spring of H+1 or H+2 (e.g. summer harvest 2008, winter harvest 2008, first opportunity to plant is spring 2009, second opportunity to plant is spring 2010).
- Suggested minimum planting stock dimensions should be equivalent to a BC Ministry of Forests and Range Sw PSB412A(1+0).
- If animal damages becomes a concern, re-planting is the best option.

7.3.3. Maintenance of trial

- Competing vegetation impacts will be part of the research trial so will not require treatment. Maintenance can be completed annually in conjunction with re-measurements.

7.4 Post-Treatment Measurements

At the start of the experiment, each naturally regenerated tree in each plot will be tagged. In the planted plots, naturally regenerated trees and planted trees will be tagged and for each their origin noted. At the start of the experiment, all plots will be surveyed for regeneration, and planted plots will be planted to a maximum density of one tree per 2.5m x 2.5m. The additional plot measurements noted above should also be recorded. Digital photos of each plot should be taken.

This study has been set up to provide information about the response of indicators (measurable characteristic of the system used to evaluate the outcome of management actions) to the alternative treatments over time. This study will measure the following indicators:

- Time to free growing
- Growth and survival of the planted and naturally regenerated conifer trees (e.g. height, diameter, cover; categorical values including foliage condition, leader condition, stem condition, damage code, vigour code).
- Height, diameter and percent cover and species of non-crop vegetation
- Soil disturbance (forest floor displacement, compaction, soil displacement, surface erosion, etc.)
- Soil productivity (nutrient analysis, CEC, organic matter content, etc.)
- Carbon balance
- Wildlife use (birds, fur bearers and large mammal diversity and abundance)

7.5 Signage

Once the trial has been installed, signage will be erected explaining what the research is about, what we hope to learn from this research, who is involved, when it was installed and who to contact for more information.

8.0 Statistical Analysis

Data will be analyzed according to the following four steps (per Nemec, 1992):

8.1 Prepare summary statistics and graphical displays of the data

Mean, standard deviation, skewness, kurtosis and sample size, by treatment and by assessment time. Also, boxplots of the subplot values for the corresponding subsets of data will be prepared. A plot of the treatment group means versus time will be prepared. The absolute or relative (percent) frequencies of categorical variables will also be tabulated.

8.2 Make statistical inferences concerning the efficacy of the treatments

Statistical inferences (e.g. confidence intervals, tests of hypotheses) will be based on a two-way analysis of variance (ANOVA). The statistical significance of a test is the probability that the null hypothesis (H_0) will be rejected when it is true. The level of significance that will be used is $p=0.05$. The power of a test is the probability that the H_0 will be rejected when it is false. In this study design, because of the multiple variables, the likelihood of a type II error increases.

Separate analyses of variance for each assessment time do not provide information about the effects of time. A more appropriate approach is repeated measures analysis of variance. Three hypotheses are routinely tested in a repeated measure analysis (Nemec, 1992)

- H_{01} : There is no treatment x time interaction
- H_{02} : There is no treatment effect
- H_{03} : There is no time effect

8.3 Verify model assumptions

The assumptions of ANOVA are (Motlusk, 1995):

- a. The samples are randomly selected from, or at least representative of, the larger populations.
- b. The samples were obtained independently. In the case of measurements made over time, then repeated measures ANOVA should be used.
- c. The observations within each sample were obtained independently.
- d. Populations are normally distributed (e.g. tree growth is normally distributed)
- e. The standard deviation of all the populations must be identical. This assumption is likely to be met if the sample sizes are large, and when the sample sizes are equal (for example, planted population and naturally regenerated population). Therefore, it will be important to survey plots first to get estimate of the number of trees to plant in planted plots.

8.4 Interpretation and summary of the results of the analysis.

The final step in a statistical analysis is the interpretation and summary of the results. If certain hypotheses were not rejected, the power of the test should be calculated. The assumptions on which the analysis is based should be explicitly stated, and sufficient detail should be provided to allow an independent assessment of the conclusions (for example, when reporting the results of an ANOVA the degrees of freedom, sums of squares and F-ratios should be provided), The statistical analysis should match the experimental design, and results should not be presented unless the validity of the underlying assumptions and the extent to which any violations would invalidate the conclusions have been considered (for example, the effect of unequal variances).

9.0 Milestones

The installation of the trial will depend on when the Areas are scheduled for harvest. Because this information is not yet known, we will refer to the year of harvest as “H”. Subsequent years are designated as “H+X”.

Task	Schedule
Installation of trial (Pre-harvest layout and baseline data collection)	H-1
Monitor harvesting and re-establish GPS treatment boundaries after harvest	H
First measurement and plant (spring after the completion of harvest)	H+1
Analyze results, reporting	H+1
Re-measurement	H+2
Analyze results, reporting	H+2
Re-measurement	H+3
Analyze results, reporting	H+3
Re-measurement	H+5
Analyze results, reporting	H+5
Re-measurement	H+10
Analyze results, reporting	H+10
Re-measurement every 10 years to stand age 50	H+10...H+50
Analyze results, reporting	H+10...H+50

10.0 Further Work

This study could be replicated elsewhere in the Yukon to test the effect of summer and winter harvesting in different Yukon ecoregions. Possible sites that could be considered include:

- Gunnar Nilsson and Mickey Lammers Research Forest
- McQuesten Research Forest
- Teslin Demonstration Forest
- Watson Lake Research Forest

11.0 Contact

For more information about this study, please contact:

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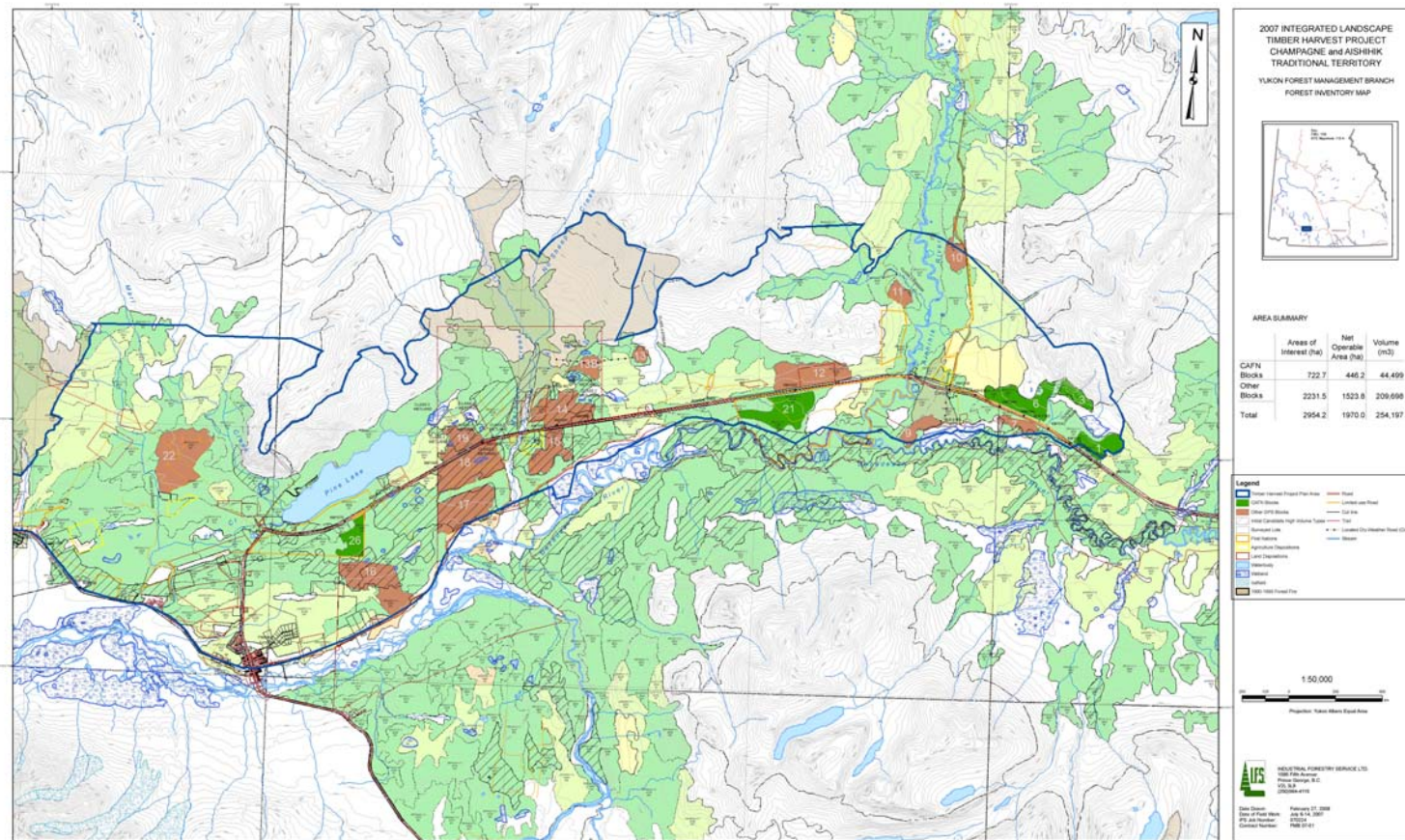
Or

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Appendix A: CATT 2008 Timber Harvest Project area map showing boundaries of Marshall Creek Forestry Reserve



Appendix B: Characteristics of harvest areas in (or near) the Marshall Creek Forestry Reserve

Ecological Characteristics of THP harvest areas that fall within the Marshall Creek Forestry Reserve

Area	Gross Operable Area (ha)	Species Composition	NDZ	Vegetation Type ²	Beetle Attack Total /Dead (%)	Terrain	Meso-Position
13	24.8	SW9A1	Simple upland	V17 – Open white spruce forest	86 / 83	Even	Mid
13b	39.5	SW10	Simple upland	V17 – Open white spruce forest	100 /83	Rolling	Mid
14	165.7	SW10	Simple upland	V17 – Open white spruce forest	75 / 60	Even	Level
15	98.9	SW10	Simple upland	V17 – Open white spruce forest	100 / 62	Even	Level
17	207.1	SW10	Simple upland	V17 – Open white spruce forest	87 / 54	Even	Level
18	159.8	SW8A2	Simple upland	V17 – Open white spruce forest	78 / 64	Even	Level
19	68.1	SW9A1	Simple upland	V17 – Open white spruce forest	86 / 57	Even	Level

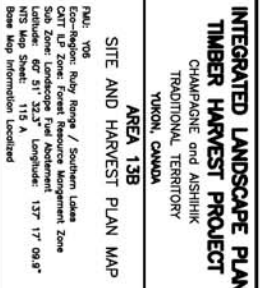
Soil characteristics of THP harvest areas that fall within the Marshall Creek Forestry Reserve

Area	Average slope (%)	Soil Type ²	Parent Material	Moisture Regime	Soil Drainage	Soil Nutrient Regime	Duff Depth / Soil Texture / % CF
13	5	S10 (Moist / Fine Loamy-Clayey)	Morainial	Moist	ModWell	Medium	14cm SiCL 20%
13b	6	S4 (Fresh / Silty-Silt Loamy)	Morainial	Fresh	Well	Medium	8cm SiL 20-40%
14	0-5%	S3 (Fresh / Coarse Loamy) - S6 (Fresh / Clayey)	Glaciofluvial and glaciolacustrine	Very fresh-very moist	Well-Imperfect	Medium	8cm L-Si-SiS-SiC <5%
15	2%	S5 (Fresh / Fine Loamy)	Glaciofluvial and glaciolacustrine	Fresh	Well-ModWell	Medium	8cm Cl-SiCL 0-40%
17	2%	S6 (Fresh / Clayey)	Glaciofluvial and glaciolacustrine	Fresh	Well-ModWell	Medium	9cm SiC-C <5%
18	4%	S3 (Fresh / Coarse Loamy) - S6 (Fresh / Clayey)	Glaciofluvial and glaciolacustrine	Very fresh-very moist	Well-Imperfect	Medium	12 cm SiL-SiC 0-10%
19	3%	S9 (Very Moist / Silty-Silt Loamy) – S10 (Moist / Fine Loamy-Clayey)		Moist	ModWell	Medium	11cm SiL-SiCL <5%

² Zoladeski *et al*, 1996

Appendix C: Layout of the summer/winter harvesting trial in harvest areas 13 and 13b







Study Design
Site Preparation Operational Trial
CATT Timber Harvest Project

Draft date: May 15, 2008
Prepared by: Aynslie Ogden

1.0 Introduction

The goal of site preparation, for either natural regeneration or planting, is to create an environment that favours crop tree performance – from successful seedling survival and establishment, to rapid growth (Lavender et al., 1990). Common site preparation techniques include prescribed burning, mechanical site preparation, and chemical methods, or combinations of the three. Each method has advantages and limitations, and therefore must be prescribed on a site-specific basis.

While some experiential knowledge exists amongst the community of forest practitioners working in the Yukon, very little formal research has been conducted here on the effectiveness or impact of each of these methods. In addition, little research has been conducted in the Yukon, particularly in the spruce-beetle killed forests of southwest Yukon, on the opportunities and limitations of natural regeneration of a site following harvest. Therefore, little guidance is available on when, where and how to prescribe such treatments, if at all.

The purpose of this study is to examine the effect of various mechanical site preparation treatments on the growth and survival of conifer seedlings in harvest areas in the Champagne and Aishihik Traditional Territory. This research will help to inform the development of best management practices. Two mechanical site preparation techniques will be studied -- mounding and disc trenching.

2.0 Background

The CATT SFMP requires the development and implementation of an adaptive management framework with a clear methodology and consistent procedures that can be replicated over time to provide comparison of results and changes. The plan defines adaptive management as “a dynamic approach to forest management in which the effects of treatments and decisions are continually monitored and used, with research results, to modify management practices on a continuing basis to ensure that management objectives are being met.” An important component of this feedback is an objective and research-based examination of key management assumptions, on-the-ground outcomes, and future projections of short and long-term actions. There are two kinds of adaptive management, active and passive.

Active adaptive management is a systematic process of modeling, experimentation, and monitoring to compare the outcomes of alternative management actions. Passive adaptive management is a more formal approach by which historical information is explicitly used to select what is thought to be the single best management policy. Ecosystem response to the policy is observed, and the policy is adapted accordingly. A major drawback of passive adaptive management is that it confounds environmental and anthropogenic effects because replicates and controls are not utilized. This often leads to conflict over whether ecological responses are due to environmental or anthropogenic effects (AME Team, 2008).

To assist in the development and implementation of an adaptive management framework, the Forestry Working Group tasked the Research and Monitoring Group (RMTWG) in April 2007 to address immediate opportunities to incorporate ‘active adaptive’ management experiments into the 2008 Timber Harvest Project (THP). This study is one of several such studies. The studies that were selected to be included in this THP were identified using the following criteria:

- 1) **Research questions that lend themselves to study through an active adaptive management experiment.** Operational trials (if properly designed) are good examples of active adaptive management experiments. Such trials enable a deliberate testing of alternative management policies or treatments and may be set up to provide information about the response of indicators (measurable characteristic of the system used to evaluate the outcome of management actions) to the alternative treatments.
- 2) **A need has been demonstrated for this operational trial either through the SFMP, ILP, community consultations or other research underway in the region.** The need for a study on the effectiveness or impact of alternative site preparation techniques was raised by members of the Research and Monitoring Technical Working Group (RMTWG 2007); a recent series of forest practitioner focus groups (Ogden and Innes, 2008) and a community workshop on climate change (McKinnon, 2006; Ogden and Innes, 2008).
- 3) **Using the criteria outlined in Gregory *et al.* (2007), there are no significant impediments to proceeding with a comprehensive, active, adaptive management approach involving a statistically sound experimental trial.** These criteria include: the spatial extent or complexity of the problem is not too large, in other words, an experimental design that has fewer variables is easier to implement per the principles of experimental design (see Section 6.1) than a study involving multiple variables (in this study, two variables (e.g. site preparation and planting) are proposed for study); the study has been pared down to focus on uncertainties that, if resolved, are likely to influence management decisions; costs and benefits of the study can be documented and communicated in a manner that is understandable to all stakeholders; the study design does not involve any trade-offs that might be considered taboo by some stakeholders; there is sufficient management flexibility to incorporate new information arising from the experiment into management plans and practices and lastly, that there are sufficient analytical skills available to design, evaluate and monitor the experiment.

3.0 Study Area

In selecting a suitable location for this study, we considered only those areas in the THP that fall within the existing 4900 ha Forestry Reserve near Marshall Creek. This reserve was established in 1987 and is officially designated as a Forestry Reserve under the Lands Act.¹ The 2008 CATT Timber Harvest Project identifies six harvest areas within this Reserve – areas 13b, 14, 15, 17, 18 and 19 with area 13 lying just outside the reserve boundary (see Map in Appendix A). Ecological and soil characteristics of these seven areas are summarized in Appendix B.

This study consists of two operational trials – each trial will test a different mechanical site preparation technique. Trial #1 will study mounding and Trial #2 will study disc trenching. To be able to test for the effect of each treatment, there is a need to control variables other than the treatment itself (e.g. stand conditions prior to harvest, harvest techniques, soil and terrain characteristics including aspect, elevation, slope, site position, terrain, moisture and nutrient regime need to be the same across the study area). Because this is a site preparation trial, we also wanted to select a site that has suitable soil and terrain conditions for a site preparation treatment (a primer on mechanical site preparation is provided in Appendix C). Because this trial involves some soil disturbance, we also wanted to select a harvest area with no potential for heritage resources. In selecting the harvest area for this trial we also considered the potential for issues with competing vegetation. We also wanted to select a harvest area that would be in an accessible location to enable regular visits to the area for re-measurement or demonstration, and are not anticipated to have any incompatible post-harvest uses.

For the **mounding** trial we have selected Areas 14 and 18 (Appendix D) for the following reasons:

- Both located in the forestry reserve
- Both areas are easily accessible from the Alaska Highway.
- Both areas very fresh to very moist, fine textured soils which are likely to amplify treatment results.
- Both areas allow treatment unit sizes that are operationally feasible (18 ha total, 4.5 ha per treatment unit).
- Relatively uniform site conditions throughout the trial area
- Area 14 has two repetitions of the mounding trials and Area 18 has one. Having two repetitions in one area allows for ease of operation (large enough area for site prep equipment to maneuver), data collection and comparison.

¹ A reserve may allow for use of the land, provide specific conditions of use and a time frame. Prior to activity on the land a land use permit may be required. Reserves can have development of a permanent or minor improvement. Reserved lands can contain lands that are unsurveyed, surveyed, titled to government or untitled. However, a Reserve does not give tenure to the land and is not considered a disposition. Reserve requests are reviewed through the regular land application process which ensures public, First Nation, municipal and departmental reviews of the request. Establishment of the reserve in the name of a particular department does not, initially, authorize physical development of the site. Further environmental assessment and mitigation may be required as a prelude to actual development. *Source: Lands Branch Fact Sheet on Reserves and Notations.*

For the **disc trenching** trial we have selected Areas 15 and 17 (Appendix D) for the following reasons:

- Both located in the forestry reserve
- Area 15 is adjacent to the Alaska Highway, while Area 17 is accessible from the old Alaska Highway.
- Both areas fresh sites with medium textured soils which are suitable for disc trenching.
- Both areas allow treatment unit sizes that are operationally feasible (18 ha total, 4.5 ha per treatment unit).
- Relatively uniform site conditions throughout the trial area
- Area 17 has two repetitions of the disc trenching trials and Area 15 has one. Having two repetitions in one area allows for ease of operation (large enough area for site prep equipment to maneuver), data collection and comparison.

4.0 Research Goal and Objectives

4.1 Goal:

The goal of this research project is to study the effect of two mechanical site preparation treatments on conifer seedling growth and survival.

4.2 Objectives:

1. To document and monitor changes in the growth and survival of planted conifer seedlings and naturally regenerated conifer seedlings after the application of mechanical site preparation treatments.
2. To provide a demonstration of site preparation treatments
3. To assess the economic feasibility of site preparation treatments
4. To support future decision-making on the application of site preparation treatments (e.g. to document effects of alternative management practices to support identification of best management practices)
5. To maximize opportunities to share results/findings.
6. To pilot test a study design for potential application elsewhere in the Yukon.

5.0 Research Questions and Hypotheses

Before carrying out a statistical analysis and establishing a study design, it is essential to have a precise statement of research questions and hypotheses to be tested. The null hypothesis, H_0 is usually a statement of no effect, no difference or no relationship. This study has the following research questions and hypotheses:

5.1 Does mechanical site preparation, specifically mounding, have an effect on the survival and growth of conifer seedlings?

H_0 : Mounding has no effect on conifer seedling survival and growth

H_1 : Mounding has an effect on conifer seedling survival and growth

5.2 Does mechanical site preparation, specifically disc trenching, have an effect on the survival and growth of conifer seedlings?

H_0 : Disc trenching has no effect on conifer seedling survival and growth

H_1 : Disc trenching has an effect on conifer seedling survival and growth

5.3 Does planting have an effect on the survival and growth of conifer seedlings?

H_0 : Planting has no effect on conifer seedling survival and growth

H_1 : Planting has an effect on conifer seedling survival and growth

5.4 Is there an adequate seed bank in the soils of spruce-beetle affected forests to support the natural regeneration of spruce trees?

H_0 : Planting has no effect on conifer seedling survival and growth

H_1 : Planting has an effect on conifer seedling survival and growth

5.5 Is there a combined effect of mechanical site preparation, specifically mounding, and planting on the growth and survival of conifer seedlings?

H_0 : There is no combined effect of mounding and planting on conifer seedling survival and growth

H_1 : There is a combined effect of mounding and planting on conifer seedling survival and growth

5.6 Is there a combined effect of mechanical site preparation, specifically disc trenching, and planting on the growth and survival of conifer seedlings?

H_0 : There is no combined effect of disc trenching and planting on conifer seedling survival and growth

H_1 : There is a combined effect of disc trenching and planting on conifer seedling survival and growth

5.7 Which mechanical site preparation technique has a greater effect on the growth and survival of conifer seedlings?

H_0 : Mounding has a greater effect than disc trenching on conifer seedling survival and growth

H_1 : Disc trenching has a greater effect on mounding conifer seedling survival and growth

6.0 Experimental Design

6.1 Four principles of experimental design

This study adheres to the four principles of experimental design (DeVeaux *et al.*, 2008):

6.1.1 Principle 1: Control

All sources of variation other than the factors we are testing for are controlled by making conditions as similar as possible for all treatment types. We control other sources of variation to prevent them from changing and affecting the response variable.

6.1.2 Principle 2: Randomize

Randomization allows us to equalize the effects of unknown or uncontrollable sources of variation. It does not eliminate the effects of these sources, but it spreads them out across the treatment levels so that we can see past them. If the experimental units are not assigned to treatments at random, it will not be possible to use the powerful methods of statistics to draw conclusions from the study. “Control what you can, and randomize the rest”.

6.1.3 Principle 3: Replicate

Two kinds of replication show up in comparative experiments. First, we should have replication within an experiment. Only with such replication can we estimate the variability of responses. If we have not assessed variation, the experiment is not complete. A second kind of replication, to replicate an entire experiment (e.g. in a different treatment location) is also important to enable broader conclusions to be made. This kind of replication will not be explored in this study but is proposed for a subsequent Phase.

6.1.4 Principle 4: Block

The ability to randomize to equalize variation across treatment groups works best in the long run. Sometimes, attributes of the experimental units that we are not studying and that we can't control may nevertheless affect the outcomes of an experiment (for example, soil moisture regime). By identifying these as blocks and then randomizing within each of these blocks, we can remove much of the variability due to difference among the blocks. Blocking is an important compromise between randomization and control. Blocking is only required in an experimental design when the site-specific conditions dictate it as being necessary to do so.

6.2 Completely Randomized Two-Way Analysis of Variance Design

6.2.1 Two-Way Analysis of Variance Design

This study involves a series of treatments with replicates and control areas. The study is designed to test effects of treatments individually and together. Therefore, a completely randomized two-way analysis of variance study design is proposed. In ANOVA terminology, there are two factors in the design are site preparation and planting. There are two levels for each factor: site prepped/not site prepped, planted/unplanted. The experiment consists of the following four treatments:

Treatment A - Control (No Site Prep, Not Planted)

Treatment B - Site Prep, Not Planted

Treatment C - Planted, No Site Prep

Treatment D - Site Prep and Planted

6.2.2 Control, Randomize, Replicate, Block

It is important that the design be balanced – there must be an equal number of plots per treatment type. The block is divided into four treatments types noted above in 6.2.1 which are replicated three times (twice in one harvest area and once in another harvest area). The location of the treatments is completely randomized in each block.

If a block is not a homogenous unit (for example, if there is a slope, moisture or fertility gradient in the block), the study design should be altered from a completely randomized design to a randomized block design. In a randomized block design, the block would be divided into three rows. The rows themselves should be homogenous within each row and different across the rows. The treatments should be randomized in each row. See Figures 1-2.

6.2.5 Repeated Measures Design

Repeated measurements of survival and growth of naturally regenerated trees and planted trees will be taken on the following time schedule: at the start of the experiment; one growing season later; two growing seasons later; five growing seasons later; ten growing seasons later; every ten growing seasons following to stand age 50.

6.2.6 Sample Size

The sampling unit is a single tree within each subplot. Sample size must be sufficiently large to ensure that any treatment effect of practical significance has a high probability of detection (e.g. 20-30 trees per plot per Nemec, 1992).

6.2.7 Size of Plots

It is important that the design be balanced – plots must be of similar size. Plots should be of an adequate size to allow for the growth of 25 crop trees. Assuming a planting density of 1 tree per 2.5 m², plots should be of a minimum size of 12.5m x 12.5m.

Figure 1: Experimental Design of Site Preparation Trial
 (Note: Treatments will be randomly assigned in each block)

Block 1:
Area 18 (Mound) Area 15 (Trench)

Site prep No planting	Control: No site prep No planting
Site prep Planting	No site prep Planting

Block 2:
Area 14 (Mound) Area 17 (Trench)

Site prep No planting	Control: No site prep No planting
Site prep Planting	No site prep Planting

Block 3:
Area 14 (Mound) Area 17 (Trench)

Site prep No planting	Control: No site prep No planting
Site prep Planting	No site prep Planting

7.0 Installing the Trial

7.1 Pre-treatment measurements

Pre-treatment measurements need to determine if the block is not a homogenous unit (for example, if there is a slope, moisture or fertility gradient). If there is, the block study design will need to be a randomized block design and the design should be divided into three rows. The rows themselves should be homogenous within each row and different across the rows and the treatments should be randomized in each row. To assess the homogeneity of the block, detailed plots per the protocols outlined in the Yukon Forestry Field Manual and Monitoring Protocols (FMB, 2008) will be installed at a regular spacing throughout the block.

7.2 Marking the site

The corners of the each block will be staked and the GPS coordinates noted. Each plot within the block should also have the corner staked, and a stake with the treatment type should be placed in the centre of each plot. Establishment of each block should be done after harvest.

7.3 Treatments

7.3.1 Harvesting and Site Preparation

- Harvesting will be during winter conditions as per the remainder of each harvest area and need not have any particular specifications other than keeping the site reasonably clear slash and debris. Only the actions of the site preparation contractor affect the outcome of this trial.
- Upon post harvest inspection and site marking, if advanced regeneration or slash is excessive, a clearing clause should be added to the site preparation contract to facilitate the require site preparation method.
- Site preparation should ideally be scheduled for one year after harvest.
- Mounding should be carried out using an excavator with bucket (Cat 205LC or equivalent). This medium sized excavator is readily available and will create small to medium sized mounds, sufficient for these sites.
- Disc trenching should be carried out using TTS Delta or TTS 35 Disc Trencher. These types of trenchers are also readily available and suitable for a wide variety of sites common to Yukon. The suggested prime mover would be a LGP rubber tired skidder for performance and maneuverability.
- Site preparation should be carried out during dry summer conditions.
- The harvest areas have been chosen to minimize impacts on other resource values and the S&HP will describe any potential concerns relative to the guiding CATT ILP document.

7.3.2 Planting

At the start of the experiment, each naturally regenerated tree in each plot will be tagged. In the planted plots, naturally regenerated trees and planted trees will be tagged and for each their origin noted. At the start of the experiment, all plots will be surveyed for regeneration, and planted plots will be planted to a maximum density of 25 trees per 12.5m x 12.5m plot (including natural regeneration). The additional plot measurements noted above should also be recorded. Digital photos of each plot should be taken.

- If not already in storage, sufficient seeds should be collected from the Haines Junction area at least two years before harvest to allow time to grow planting stock for the treatment areas.
- Planting should be carried out during the spring of H+2.

- For the mounding trial, planting should be on the mound, but roots must deep enough to contact organic material within the mound.
- For the disc trenching trial, alternative planting spots (top, hinge and trench) may be tried if desired.
- Suggested minimum planting stock dimensions should be equivalent to a BC Ministry of Forests and Range Sw PSB313B (1+0).
- If an animal damage becomes a concern, re-planting is the best option.

7.3.3. Maintenance of trial

- Competing vegetation impacts will be part of the research trial so will not require treatment. Maintenance can be completed annually in conjunction with re-measurements.

7.4 Post-Treatment Measurements

This study has been set up to provide information about the response of indicators (measurable characteristic of the system used to evaluate the outcome of management actions) to the alternative treatments over time. This study will measure indicators of growth and survival of the planted and naturally regenerated conifer trees (e.g. height, diameter, cover; categorical values including foliage condition, leader condition, stem condition, damage code, vigour code). In addition, the height, diameter and percent cover and species of non-crop vegetation will be recorded.

7.5 Signage

Once the trial has been installed, signage will be erected explaining what the research is about, what we hope to learn from this research, who is involved, when it was installed and who to contact for more information.

8.0 Statistical Analysis

Data will be analyzed according to the following four steps (per Nemec, 1992):

8.1 Prepare summary statistics and graphical displays of the data

Mean, standard deviation, skewness, kurtosis and sample size, by treatment and by assessment time. Also, boxplots of the subplot values for the corresponding subsets of data will be prepared. A plot of the treatment group means versus time will be prepared. The absolute or relative (percent) frequencies of categorical variables will also be tabulated.

8.2 Make statistical inferences concerning the efficacy of the treatments

Statistical inferences (e.g. confidence intervals, tests of hypotheses) will be based on a two-way analysis of variance (ANOVA). The statistical significance of a test is the probability that the null hypothesis (H_0) will be rejected when it is true. The level of significance that will be used is $p=0.05$. The power of a test is the probability that the H_0 will be rejected when it is false. In this study design, because of the multiple variables, the likelihood of a type II error increases.

Separate analyses of variance for each assessment time do not provide information about the effects of time. A more appropriate approach is repeated measures analysis of variance. Three hypotheses are routinely tested in a repeated measure analysis (Nemec, 1992)

- H_{01} : There is no treatment x time interaction
- H_{02} : There is no treatment effect
- H_{03} : There is no time effect

8.3 Verify model assumptions

The assumptions of ANOVA are (Motlusk, 1995):

- a. The samples are randomly selected from, or at least representative of, the larger populations.
- b. The samples were obtained independently. In the case of measurements made over time, then repeated measures ANOVA should be used.
- c. The observations within each sample were obtained independently.
- d. Populations are normally distributed (e.g. tree growth is normally distributed)
- e. The standard deviation of all the populations must be identical. This assumption is likely to be met if the sample sizes are large, and when the sample sizes are equal (for example, planted population and naturally regenerated population). Therefore, it will be important to survey plots first to get estimate of the number of trees to plant in planted plots.

8.4 Interpretation and summary of the results of the analysis.

The final step in a statistical analysis is the interpretation and summary of the results. If certain hypotheses were not rejected, the power of the test should be calculated. The assumptions on which the analysis is based should be explicitly stated, and sufficient detail should be provided to allow an independent assessment of the conclusions (for example, when reporting the results of an ANOVA the degrees of freedom, sums of squares and F-ratios should be provided), The statistical analysis should match the experimental design, and results should not be presented unless the validity of the underlying assumptions and the extent to which any violations would invalidate the conclusions have been considered (for example, the effect of unequal variances).

9.0 Milestones

The installation of the trial will depend on when the Areas are scheduled for harvest. Because this information is not yet known, we will refer to the year of harvest as “H”. Subsequent years are designated as “H+X”.

Task	Schedule
Installation of trial and establish GPS treatment boundaries after harvest	H
Site Preparation (dry summer conditions)	H+1
Plant (spring)	H+2
First measurement of survival and growth (immediately after planting)	H+2
Re-measurement of survival and growth	H+3
Analyze results, reporting	H+3
Re-measurement	H+5
Analyze results, reporting	H+5
Re-measurement every 10 years to stand age 50	H+10...H+50
Analyze results, reporting	H+10...H+50

10.0 Further Work

This project is phase one of broader study on site preparation. Phase 1 (this study) will explore mechanical site preparation methods. Phase 2 of this study may involve: a) expanding on Phase 1 by exploring the effects of mechanical site preparation on different site types than were explored in this study (e.g. landings and roads, drier or wetter sites); and b) explore the effects of prescribed burning. A study design for Phase 2 will be developed at a later stage.

In addition, this study could be replicated elsewhere in the Yukon to test the effect of planting and site preparation in different Yukon ecoregions. Possible sites that could be considered include:

- Gunnar Nilsson and Mickey Lammers Research Forest
- McQuesten Research Forest
- Teslin Demonstration Forest
- Watson Lake Research Forest

11.0 Contact

For more information about this study, please contact:

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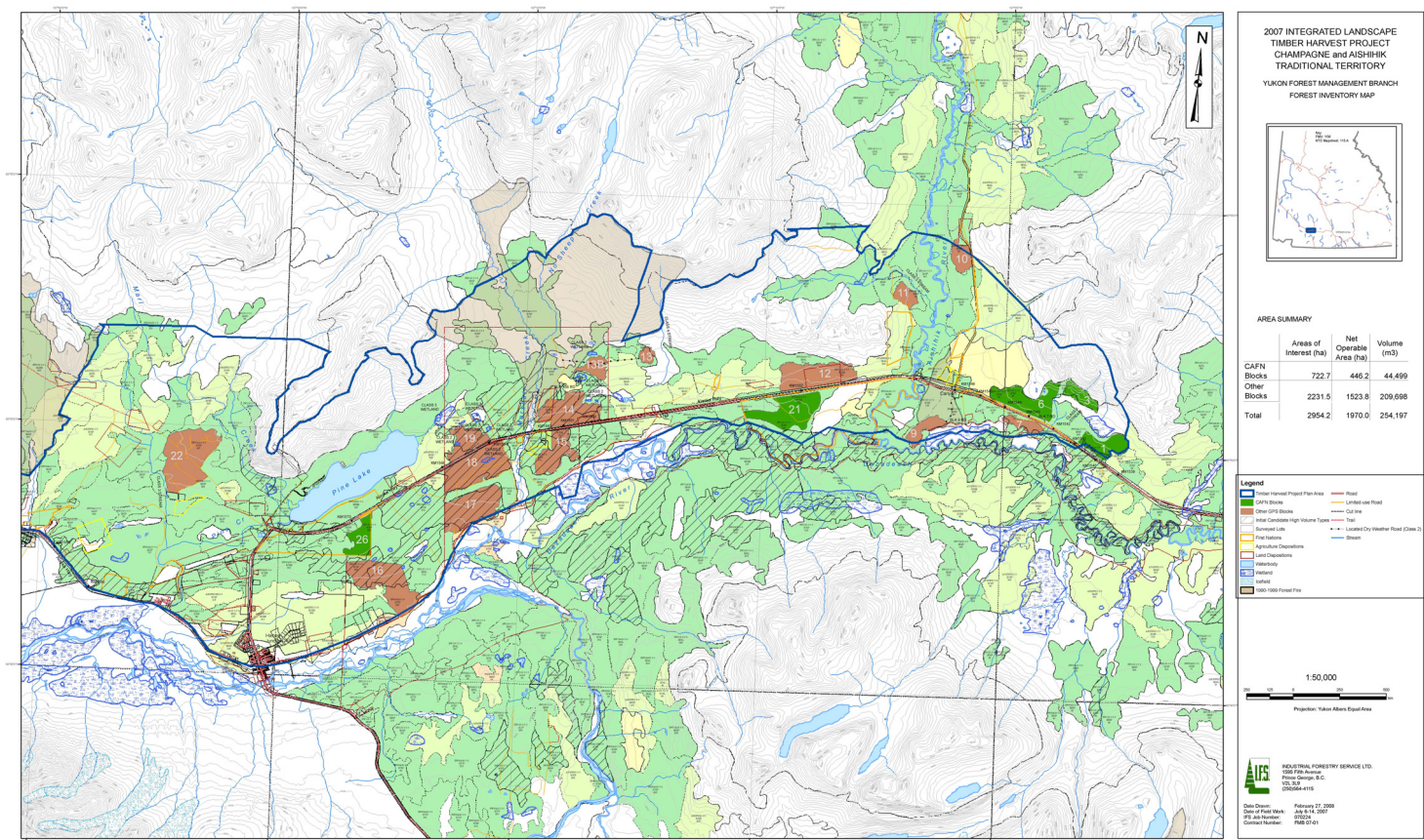
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Appendix A: CATT 2008 Timber Harvest Project area map showing boundaries of Marshall Creek Forestry Reserve



Appendix B: Characteristics of harvesting areas in (or near) the Marshall Creek Forestry Reserve

Ecological characteristics of THP harvest areas that are in or near the Marshall Creek Forestry Reserve

Area	Gross Operable Area (ha)	Species Composition	NDZ	Vegetation Type ²	Beetle Attack Total /Dead (%)	Terrain	Meso-Position
13	24.8	SW9A1	Simple upland	V17 – Open white spruce forest	86 / 83	Even	Mid
13b	39.5	SW10	Simple upland	V17 – Open white spruce forest	100 /83	Rolling	Mid
14	165.7	SW10	Simple upland	V17 – Open white spruce forest	75 / 60	Even	Level
15	98.9	SW10	Simple upland	V17 – Open white spruce forest	100 / 62	Even	Level
17	207.1	SW10	Simple upland	V17 – Open white spruce forest	87 / 54	Even	Level
18	159.8	SW8A2	Simple upland	V17 – Open white spruce forest	78 / 64	Even	Level
19	68.1	SW9A1	Simple upland	V17 – Open white spruce forest	86 / 57	Even	Level

Soil characteristics of THP harvest areas that are in or near the Marshall Creek Forestry Reserve

Area	Average slope (%)	Soil Type ²	Parent Material	Moisture Regime	Soil Drainage	Soil Nutrient Regime	Duff Depth / Soil Texture / % CF
13	5	S10 (Moist / Fine Loamy-Clayey)	Morainal	Moist	ModWell	Medium	14cm SiCL 20%
13b	6	S4 (Fresh / Silty-Silt Loamy)	Morainal	Fresh	Well	Medium	8cm SiL 20-40%
14	0-5%	S3 (Fresh / Coarse Loamy) - S6 (Fresh / Clayey)	Glaciofluvial and glaciolacustrine	Very fresh-very moist	Well-Imperfect	Medium	8cm L-Si-SiS-SiC <5%
15	2%	S5 (Fresh / Fine Loamy)	Glaciofluvial and glaciolacustrine	Fresh	Well-ModWell	Medium	8cm Cl-SiCL 0-40%
17	2%	S6 (Fresh / Clayey)	Glaciofluvial and glaciolacustrine	Fresh	Well-ModWell	Medium	9cm SiC-C <5%
18	4%	S3 (Fresh / Coarse Loamy) - S6 (Fresh / Clayey)	Glaciofluvial and glaciolacustrine	Very fresh-very moist	Well-Imperfect	Medium	12 cm SiL-SiC 0-10%
19	3%	S9 (Very Moist / Silty-Silt Loamy) – S10 (Moist / Fine Loamy-Clayey)		Moist	ModWell	Medium	11cm SiL-SiCL <5%

² Zoladeski *et al*, 1996

Appendix C: Mechanical Site Preparation: A Primer

Mounding is suited to generating raised planting spots and good growing sites for seedlings, especially in cold moist climates. They may be created manually or through the use of heavy equipment. Mounds vary in size depending on their composition and the objective of the mound treatment – on heavy clay soils mounds require only 10-14cm of mineral soil capping while on wet organic soils mounds can be as large as required to elevate the seedling root system above restrictive high water tables. Increased soil temperature, loose and oxygen-rich mineral soils and good drainage promotes rapid root growth, seedling establishment and early seedling performance. Mounds can control competing vegetation, retain nutrients of surface organic layers, increase light available to seedlings and reduce the hazard of snow press and frost damage (BCMOF, 1992). In appropriate mounding or improper (shallow) planting on a mound can make the crop seedling vulnerable to drought and increase the risk of frost heaving.

Disc trenching is recommended for a wide range of sites for natural regeneration or planting. They are not recommended for wet or steep sites. On sloped sites where erosion from water channeling is a concern, disc trenching is recommended to be performed only intermittently. Disc trenching can produce 3 distinct planting positions- trench position for dry sites, hinge position for medium sites, and berm position for moist sites (BCMOF, 1992).

Scalping involves exposing patches of mineral soil in a systematic pattern. Scalps should only be deep enough to remove unfavourable litter and duff layers and expose well-decomposed organic or favourable mineral soil horizons. Scalping is recommended for dry sites, sites with a thin humus layer, sloped sites where erosion due to water channelling is a concern and sites where continuous trenches would encourage the spread of unwanted vegetation (BCMOF, 1992).

Mixing can control competing vegetation, increase soil temperature and aeration, decrease soil bulk density, improve soil water relations and retain nutrients stored in surface organic layers immediately available to crop seedlings (BCMOF, 1992). There are different types of mixing – coarse, fine and spot. Coarse mixing is accomplished using large discing implements that heap clods of surface organic and mineral layers into a bed – it provides little control of competing vegetation but is beneficial where low soil temperatures and/or high soil water tables inhibit seedling growth. Fine mixing is used on sites with high competing vegetation potential and involves chopping up propagating plant parts small enough to control resprouting – it is suitable on fine-textured soils with few cobbles or boulders. Spot mixing is prescribed for sites where slash, stumps or other obstacles prohibit use of strip mixing implements and is also used on sites where minimal soil disturbance is required.

Matching the method to the site. The BC Ministry of Forests has recommended applications of site preparation techniques for different site conditions (BCMOF, 1992). Are these recommendations applicable north of 60 degrees? This research aims to provide some answers to this question.

Recommendations from British Columbia on matching the method to the site (BCMOF, 1992)

Method		Coarse to medium-textured soils				Fine-textured soils			
	<i>Slash/Obstacles</i>	<i>Heavy</i>		<i>Light</i>		<i>Heavy</i>		<i>Light</i>	
	<i>Humus Layer</i>	<i>Thick</i>	<i>Thin</i>	<i>Thick</i>	<i>Thin</i>	<i>Thick</i>	<i>Thin</i>	<i>Thick</i>	<i>Thin</i>
Spot scalping	Dry site	N/A	R	N/A	R	N/A	A	N/A	A
	Medium site	R	R	R	R	A	A	A	A
	Wet site	U	N/A	U	N/A	U	N/A	U	N/A
Disc trenching	Dry site	N/A	A	N/A	A	N/A	R	N/A	R
	Medium site	A	R	R	R	A	R	R	R
	Wet site	U	N/A	A	N/A	U	N/A	A	N/A
Mounding	Dry site	N/A	U	N/A	U	N/A	U	N/A	U
	Medium site	A	A	A	A	A	A	A	A
	Wet site	R	N/A	R	N/A	R	N/A	R	N/A
Coarse mixing	Dry site	N/A	U	N/A	R-Spot	N/A	U	N/A	R
	Medium site	U	U	A	R	U	U	A	R
	Wet site	U	N/A	R-Raised	N/A	U	N/A	R-Raised	N/A
Fine mixing	Dry site	N/A	U	N/A	U	N/A	U	N/A	A
	Medium site	U	U	A	R	U	U	A	R
	Wet site	U	N/A	R-Raised	N/A	U	N/A	R-Raised	N/A

R = recommended

A = acceptable

U = unsuitable

N/A = not applicable

**Appendix D: Layout of the mounding trial in harvest areas 14 and 18 and the
disc trenching trial in harvest areas 15 and 17**

Study Design
Understory Retention Operational Trial
CATT Timber Harvest Project

Draft date: May 15, 2008
Prepared by: Aynslie Ogden

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1.0 Introduction

In the Yukon and elsewhere, understory retention is commonly prescribed as a stand-level measure for conserving biodiversity when forest pest have killed the entire main canopy. Others have expressed the concern that as the roots of beetle killed trees decay, large numbers of snags begin to blow over or break off resulting in the accumulation of ground fuels, elevated fire hazard and decrease the use of these sites by certain species of wildlife due to difficulties walking through windthrown trees. Concerns have also been raised about the potential negative impact of understory retention on the economics of salvage harvesting in the southwest Yukon.

Very little formal research has been conducted in the Yukon on understory retention management practices and the impact of these alternative practices on biodiversity, post-harvest mortality rates, fire behaviour and economic viability of harvesting operations. Therefore, there is an opportunity to conduct research to explore these relationships to provide guidance on when, where and how to prescribe understory retention treatments and to aid in the development of best management practices for understory retention in spruce-beetle affected forests. The results will also be transferable to northern BC and Alberta where pine beetles have created vast stands of a similar nature.

The purpose of this study is to establish an active adaptive management experiment to assess alternative understory retention strategies on post-harvest mortality rates, the economics of forest harvesting, wildlife use of these areas and potential forest fire behaviour in the Champagne and Aishihik Traditional Territory. Understory retention trials may be designed to test harvest intensity or harvest pattern. This study is designed to test a combination of pattern and level of understory retention (all non-beetle attacked trees) in severely attacked stands where no other “alternative” silviculture options are available.

2.0 Background

The CATT SFMP requires the development and implementation of an adaptive management framework with a clear methodology and consistent procedures that can be replicated over time to provide comparison of results and changes. The plan defines adaptive management as “a dynamic approach to forest management in which the effects of treatments and decisions are continually monitored and used, with research results, to modify management practices on a continuing basis to ensure that management objectives are being met.” An important component of this feedback is an objective and research-based examination of key management assumptions, on-the-ground outcomes, and future projections of short and long-term actions. There are two kinds of adaptive management, active and passive.

Active adaptive management is a systematic process of modeling, experimentation, and monitoring to compare the outcomes of alternative management actions. Passive adaptive management is a more formal approach by which historical information is explicitly used to select what is thought to be the single best management policy. Ecosystem response to the policy is observed, and the policy is adapted accordingly. A major drawback of passive adaptive management is that it confounds environmental and anthropogenic effects because replicates and controls are not utilized. This often leads to conflict over whether ecological responses are due to environmental or anthropogenic effects (AME Team, 2008).

To assist in the development and implementation of an adaptive management framework, the Forestry Working Group tasked the Research and Monitoring Group (RMTWG) in April 2007 to address immediate opportunities to incorporate ‘active adaptive’ management experiments into the 2008 Timber Harvest Project (THP). This study is one of several such studies. The studies that were selected to be included in this THP were identified using the following criteria:

- 1) **Research questions that lend themselves to study through an active adaptive management experiment.** Operational trials (if properly designed) are good examples of active adaptive management experiments. Such trials enable a deliberate testing of alternative management policies or treatments and may be set up to provide information about the response of indicators (measurable characteristic of the system used to evaluate the outcome of management actions) to the alternative treatments.
- 2) **A need has been demonstrated for this operational trial either through the SFMP, ILP, community consultations or other research underway in the region.** The need for a study on variable retention was raised by members of the Research and Monitoring Technical Working Group (RMTWG 2007); and in a recent series of forest practitioner focus groups (Ogden and Innes, 2008). However, since reconnaissance data indicates nearly a 100% mortality of overstory trees in planning area, understory retention (i.e. retaining all non-beetle attached trees) is the only retention strategy feasible in this area.
- 3) **Using the criteria outlined in Gregory *et al.* (2007), there are no significant impediments to proceeding with a comprehensive, active, adaptive management approach involving a statistically sound experimental trial.** These criteria include: the spatial extent or complexity of the problem is not too large, in other words, an experimental design that has fewer variables is easier to implement per the principles of experimental design (see Section 6.1) than a study involving multiple variables (in this study, two variables (e.g. site preparation and planting) are proposed for study); the study has been pared down to focus on uncertainties that, if resolved, are likely to influence management decisions; costs and benefits of the study can be documented and communicated in a manner that is understandable to all stakeholders; the study design does not involve any trade-offs that might be considered taboo by some stakeholders; there is sufficient management flexibility to incorporate new information arising from the experiment into management plans and practices and lastly, that there are sufficient analytical skills available to design, evaluate and monitor the experiment.

3.0 Study Area

In selecting a suitable location for this study, we considered two blocks in the THP that fall within the existing 4900 ha Forestry Reserve near Marshall Creek and one block (Area 16) immediately adjacent to it. This reserve was established in 1987 and is officially designated as a Forestry Reserve under the Lands Act.¹ The 2008 CATT Timber Harvest Project identifies six harvest blocks within this Reserve – blocks 13b, 14, 15, 17, 18 and 19 (see Map in Appendix A). Ecological and soil characteristics of these blocks are summarized in Appendix B.

This study consists of one trial replicated in three harvest areas. To be able to test for the effect of each treatment, there is a need to control variables other than the treatment itself. Within a harvest area, stand conditions prior to harvest, harvest techniques, soil and terrain characteristics including aspect, elevation, slope, site position, terrain, moisture and nutrient regime need to be the same. We also wanted to select sites that within the realm of being appropriate to prescribe for a understory retention trial – i.e. where research trials will not unduly jeopardize other resource values. We also wanted to select a harvest area where the trial would be large enough to study wildlife response to intensity of understory retention. We also wanted to select a harvest area that would be in an accessible location to enable regular visits to the area for re-measurement or demonstration, and are not anticipated to have any incompatible post-harvest uses.

We selected harvest area 16 for the following reasons:

- Located adjacent to the southwest corner of the forestry reserve
- Similar site conditions to Area 17 and Area 18
- Allows for the location of a large trial (13 ha per treatment, 52 ha overall)
- Reconnaissance data indicates reasonably well developed understory stocking of regeneration, saplings and poles
- Uniform site conditions throughout the trial area
- Easy access for treatment and re-measurement

We selected harvest area 17 for the following reasons:

- In the forestry reserve, immediately south of Area 18
- Similar site conditions to Area 16 and Area 18
- Allows for the location of a large trial (13 ha per treatment, 52 ha overall)
- Reconnaissance data indicates reasonably well developed understory stocking of regeneration, saplings and poles
- Uniform site conditions throughout the trial area
- Easy access for treatment and re-measurement

¹ A Reserve may allow for use of the land, provide specific conditions of use and a time frame. Prior to activity on the land a land use permit may be required. Reserves can have development of a permanent or minor improvement. Reserved lands can contain lands that are unsurveyed, surveyed, titled to government or untitled. However, a Reserve does not give tenure to the land and is not considered a disposition. Reserve requests are reviewed through the regular land application process which ensures public, First Nation, municipal and departmental reviews of the request. Establishment of the reserve in the name of a particular department does not, initially, authorize physical development of the site. Further environmental assessment and mitigation may be required as a prelude to actual development. *Source: Lands Branch Fact Sheet on Reserves and Notations.*

We selected harvest area 18 for the following reasons:

- In the forestry reserve, immediately north of Area 17
- Similar site conditions to Area 16 and Area 18
- Allows for the location of a large trial (13 ha per treatment, 52 ha overall)
- Reconnaissance data indicates reasonably well developed understory stocking of regeneration, saplings and poles
 - Uniform site conditions throughout the trial area
 - Easy access for treatment and re-measurement

4.0 Research Goal and Objectives

4.1 Goal:

The goal of this research project is to establish an active adaptive management experiment to compare levels of understory retention and its effects on salvage harvest economics, post harvest stocking, growth and yield, wildlife use, biodiversity, fire hazard and vegetation competition in spruce beetle killed stands in the Champagne and Aishihik Traditional Territory.

4.2 Objectives:

1. To document and monitor and compare alternative understory retention strategies.
2. To provide a demonstration of understory retention
3. To assess the economic feasibility of understory retention strategies.
4. To support future decision-making on the application of understory retention strategies (e.g. to document effects of alternative management practices to support identification of best management practices)
5. To maximize opportunities to share results/findings.
6. To pilot test a study design for potential application elsewhere in the Yukon.

5.0 Research Questions and Hypotheses

Before carrying out a statistical analysis and establishing a study design, it is essential to have a precise statement of research questions and hypotheses to be tested. The null hypothesis, H_0 is usually a statement of no effect, no difference or no relationship. This study has the following research questions and hypotheses:

5.1 Does the pattern and level of understory retention impact the cost of salvage harvesting?

H_0 : The pattern and level of understory retention has no effect on the cost.

H_1 : The pattern and level of understory retention has an effect on the cost.

5.2 Does the pattern and level of understory retention impact post harvest stocking?

H_0 : The pattern and level of understory retention has no effect on post harvest stocking.

H_1 : The pattern and level of understory retention has an effect on post harvest stocking.

5.3 Does the pattern and level of understory retention impact growth and yield?

H_0 : The pattern and level of understory retention has no effect on growth and yield.

H_1 : The pattern and level of understory retention has an effect on growth and yield.

5.4 Does the pattern and level of understory retention impact wildlife use?

H_0 : The pattern and level of understory retention has no effect on wildlife use.

H_1 : The pattern and level of understory retention has an effect on wildlife use.

5.5 Does the pattern and level of understory retention impact on biodiversity?

H_0 : The pattern and level of understory retention has no effect on biodiversity.

H_1 : The pattern and level of understory retention has an effect on biodiversity.

5.6 Does the pattern and level of understory retention impact on fire hazard?

H_0 : The pattern and level of understory retention has no effect on fire hazard.

H_1 : The pattern and level of understory retention has an effect on fire hazard.

5.7 Does the pattern and level of understory retention impact on soil disturbance (compaction, rutting, forest floor displacement, etc.)?

H_0 : The pattern and level of understory retention has no effect on soil disturbance.

H_1 : The pattern and level of understory retention has an effect on soil disturbance.

5.8 Does the pattern and level of understory retention impact on vegetation competition (post harvest vegetation development)?

H_0 : The pattern and level of understory retention has no effect on vegetation competition

H_1 : The pattern and level of understory retention has an effect on vegetation competition

6.0 Experimental Design

6.1 Four principles of experimental design

This study adheres to the four principles of experimental design (DeVeaux *et al.*, 2008):

6.1.1 Principle 1: Control

All sources of variation other than the factors we are testing for are controlled by making conditions as similar as possible for all treatment types. We control other sources of variation to prevent them from changing and affecting the response variable.

6.1.2 Principle 2: Randomize

Randomization allows us to equalize the effects of unknown or uncontrollable sources of variation. It does not eliminate the effects of these sources, but it spreads them out across the treatment levels so that we can see past them. If the experimental units are not assigned to treatments at random, it will not be possible to use the powerful methods of statistics to draw conclusions from the study. “Control what you can, and randomize the rest”.

6.1.3 Principle 3: Replicate

Two kinds of replication show up in comparative experiments. First, we should have replication within an experiment. Only with such replication can we estimate the variability of responses. If we have not assessed variation, the experiment is not complete. A second kind of replication, to replicate an entire experiment (e.g. in a different treatment location) is also important to enable broader conclusions to be made. This kind of replication will not be explored in this study but is proposed for a subsequent Phase.

6.1.4 Principle 4: Block

The ability to randomize to equalize variation across treatment groups works best in the long run. Sometimes, attributes of the experimental units that we are not studying and that we can't control may nevertheless affect the outcomes of an experiment (for example, soil nutrient regime). By identifying these as blocks and then randomizing within each of these blocks, we can remove much of the variability due to difference among the blocks. Blocking is an important compromise between randomization and control. Blocking is only required in an experimental design when the site-specific conditions dictate it as being necessary to do so.

6.2 One-Way Analysis of Variance Design

6.2.1 One-Way Analysis of Variance Design

This study involves a series of treatments with replicates and control areas. The study is designed to test effects of different treatments intensities. Therefore, a completely randomized one-way analysis of variance study design is proposed. In ANOVA terminology, there is one factor in the design. There are four levels for this factor: control, no harvest (100% retention); strip harvest, designated skid trails ($\pm 70\%$ retention); random skid, operator selection of trails ($\pm 50\%$ retention); and no harvest restrictions (0% retention). The experiment consists of the following four treatments:

- Treatment A – 100% retention; control, no harvest
- Treatment B – $\pm 70\%$ retention; strip harvest, designated skid trails
- Treatment C – $\pm 50\%$ retention; random skid, operator selection of trails
- Treatment D – 0% retention; no harvest restrictions

6.2.2 Control, Randomize, Replicate, Block

It is important that the design be balanced – there must be an equal number of plots per treatment type. The block is divided into four plots, one plot for each treatment type. The location of the treatments is completely randomized in each block. The block is replicated three times. See Figure 1.

If a block is not a homogenous unit (for example, if there is a slope, moisture or fertility gradient in the block), the study design should be altered from a completely randomized design to a randomized block design. In a randomized block design, the block would be divided into rows. The rows themselves should be homogenous within each row and different across the rows. The treatments would then be randomized in each row.

6.2.5 Repeated Measures Design

Repeated measurements will be taken on the following time schedule: at the start of the experiment; one growing season later; two growing seasons later; five growing seasons later; ten growing seasons later; every ten growing seasons following to stand age 50.

6.2.6 Sample Size

The sampling unit is a single tree within each subplot. Sample size must be sufficiently large to ensure that any treatment effect of practical significance has a high probability of detection.

6.2.7 Size of Plots

It is important that the design be balanced – plots must be of similar size (13 ha per treatment, 52 ha per block).

Treatment A – 100% retention (control)

Treatment B – $\pm 70\%$ retention

Treatment C – $\pm 50\%$ retention

Treatment D – 0% retention

Figure 1: Experimental Design of Understory Retention Trial

(Note: Treatments will be randomly assigned in each block)

Area 16:

Treatment A 100% retention (control)	Treatment B $\pm 70\%$ retention
Treatment D 0% retention	Treatment C $\pm 50\%$ retention

Area 17:

Treatment C $\pm 50\%$ retention	Treatment B $\pm 70\%$ retention
Treatment D 0% retention	Treatment A 100% retention (control)

Area 18:

Treatment A 100% retention (control)	Treatment B $\pm 70\%$ retention
Treatment C $\pm 50\%$ retention	Treatment D 0% retention

7.0 Installing the Trial

7.1 Pre-Treatment Measurements

Pre-treatment measurements need to determine if the block is not a homogenous unit (for example, if there is a slope, moisture or fertility gradient). If there is, the block study design will need to be a randomized block design and the design should be divided into three rows. The rows themselves should be homogenous within each row and different across the rows and the treatments should be randomized in each row. To assess the homogeneity of the block, detailed plots per the protocols outlined in the Yukon Forestry Field Manual and Monitoring Protocols (FMB, 2008) will be installed at a regular spacing throughout the block. It is particularly important to carry out a pre-harvest assessment of understory regeneration (all non-beetle attacked trees) at intensity of about one 50m² sample per quarter hectare (3.99m radius sample size on a 50m x 50m grid).

7.2 Marking the site

The corners of the each block will be staked and the GPS coordinates noted. Each plot within the block should also have the corner staked (metal stake sunk into the ground to avoid disturbance by machinery), and a stake with the treatment type should be placed in the centre of each plot. In addition, boundaries of each treatment units will be ribboned and GPS traversed. For treatment unit B, individual harvest trails will have centre line marked every 21m (i.e. to facilitate a felling and skidding with minimal understory damage, the trails must be at least 6m wide. Also the leave strip cannot be greater than 15m wide to allow the buncher to “reach” all the dead trees in leave strip from the trail on each side). Thus the “undisturbed” area is 15m for 21m of forest per length of the treatment or about 70%

7.3.1 Harvesting

- Temporary road access will be located to facilitate easy harvest layout and treatment
- All harvesting will be in winter to minimize site degradation
- The Site and Harvest Plan (S&HP) will reference this Study for details of harvest layout and execution
- Daily harvest supervision by FMB staff familiar with the objectives of this research is required
- Harvest / regeneration method is dictated by each treatment unit requirements (Specified as separate units in the S&HP).
- Harvest equipment is expected to be Feller-Buncher and Grapple Skidder for all treatments.
- To facilitate harvest cost accounting and to ensure that treatment objectives are met, a specific contract should be developed for all three treatment areas with a single contractor.
- While the same operator must complete all research treatments, it is not imperative that the remainder of the harvest area be harvested by the same contractor. Nor is it imperative that the remainder of the harvest area be harvested at the same time (i.e. the trial can be separate if desired)
- The harvest areas (Areas 16, 17, 18) have been chosen to minimize impacts on other resource values and the S&HP will describe any potential concerns relative to the guiding CATT ILP document.

7.3.2. Maintenance of trial

- Competing vegetation impacts will be part of the research trial so will not require treatment. Maintenance can be completed annually in conjunction with re-measurements.

7.4 Post-Treatment Measurements

This study has been set up to provide information about the response of indicators (measurable characteristic of the system used to evaluate the outcome of management actions) to the alternative treatments over time. This study will measure the following indicators:

- Volume harvested and cost per m³
- Growth, yield, stocking, quality and density of pre and post harvest regeneration
- Post-harvest mortality (e.g. windthrow, sun-scald, disease, pests, etc.)
- Wildlife response (birds, fur bearers and large mammal diversity and abundance)
- Biodiversity (structural diversity, species diversity, habitat types, etc) over time
- Characteristics of fuels, standing and ground fuel dispersion and decay, CWD, fire hazard index
- Soil disturbance (forest floor displacement, compaction, soil displacement, surface erosion, etc.)
- Vegetation competition (vegetation species, height, percent cover, proximity to crop trees) as related to crop tree performance

7.5 Signage

Once the trial has been installed, signage will be erected explaining what the research is about, what we hope to learn from this research, who is involved, when it was installed and who to contact for more information.

8.0 Statistical Analysis

Data will be analyzed according to the following four steps (per Nemec, 1992):

8.1 Prepare summary statistics and graphical displays of the data

Mean, standard deviation, skewness, kurtosis and sample size, by treatment and by assessment time. Also, boxplots of the subplot values for the corresponding subsets of data will be prepared. A plot of the treatment group means versus time will be prepared. The absolute or relative (percent) frequencies of categorical variables will also be tabulated.

8.2 Make statistical inferences concerning the efficacy of the treatments

Statistical inferences (e.g. confidence intervals, tests of hypotheses) will be based on a one-way analysis of variance (ANOVA). The statistical significance of a test is the probability that the null hypothesis (H_0) will be rejected when it is true. The level of significance that will be used is $p=0.05$. The power of a test is the probability that the H_0 will be rejected when it is false. In this study design, because of the multiple variables, the likelihood of a type II error increases.

Separate analyses of variance for each assessment time do not provide information about the effects of time. A more appropriate approach is repeated measures analysis of variance. Three hypotheses are routinely tested in a repeated measure analysis (Nemec, 1992)

- H_{01} : There is no treatment x time interaction
- H_{02} : There is no treatment effect
- H_{03} : There is no time effect

8.3 Verify model assumptions

The assumptions of ANOVA are (Motlusk, 1995):

- a. The samples are randomly selected from, or at least representative of, the larger populations.
- b. The samples were obtained independently. In the case of measurements made over time, then repeated measures ANOVA should be used.
- c. The observations within each sample were obtained independently.
- d. Populations are normally distributed (e.g. tree growth is normally distributed)
- e. The standard deviation of all the populations must be identical. This assumption is likely to be met if the sample sizes are large, and when the sample sizes are equal (for example, planted population and naturally regenerated population). Therefore, it will be important to survey plots first to get estimate of the number of trees to plant in planted plots.

8.4 Interpretation and summary of the results of the analysis.

The final step in a statistical analysis is the interpretation and summary of the results. If certain hypotheses were not rejected, the power of the test should be calculated. The assumptions on which the analysis is based should be explicitly stated, and sufficient detail should be provided to allow an independent assessment of the conclusions (for example, when reporting the results of an ANOVA the degrees of freedom, sums of squares and F-ratios should be provided), The statistical analysis should match the experimental design, and results should not be presented unless the validity of the underlying assumptions and the extent to which any violations would invalidate the conclusions have been considered (for example, the effect of unequal variances).

9.0 Milestones

The installation of the trial will depend on when the Area is scheduled for harvest. Because this information is not yet known, we will refer to the year of harvest as “H”. Subsequent years are designated as “H+X”.

Task	Schedule
Installation of trial (Pre-harvest layout and baseline data collection)	H-1
Monitor harvesting and measurement of harvest variables	H
First measurement immediately after harvest	H
Re-measurement	H+1
Analyze results, reporting	H+1
Re-measurement	H+2
Analyze results, reporting	H+2
Re-measurement	H+3
Analyze results, reporting	H+3
Re-measurement	H+5
Analyze results, reporting	H+5
Re-measurement	H+10
Analyze results, reporting	H+10
Re-measurement every 10 years to stand age 50	H+10...H+50
Analyze results, reporting	H+10...H+50

10.0 Further Work

This study could be replicated elsewhere in the Yukon to test the effect of alternative understory retention strategies in different Yukon ecoregions. Possible sites that could be considered include:

- Teslin Demonstration Forest
- Watson Lake Research Forest

This study is designed to test a combination of pattern and level of understory retention (all non-beetle attacked trees) in severely attacked stands where no other “alternative” silviculture options are available. A further study could focus on variable retention strategies where sufficient live mature trees are present in the main canopy.

11.0 Contact

For more information about this study, please contact:

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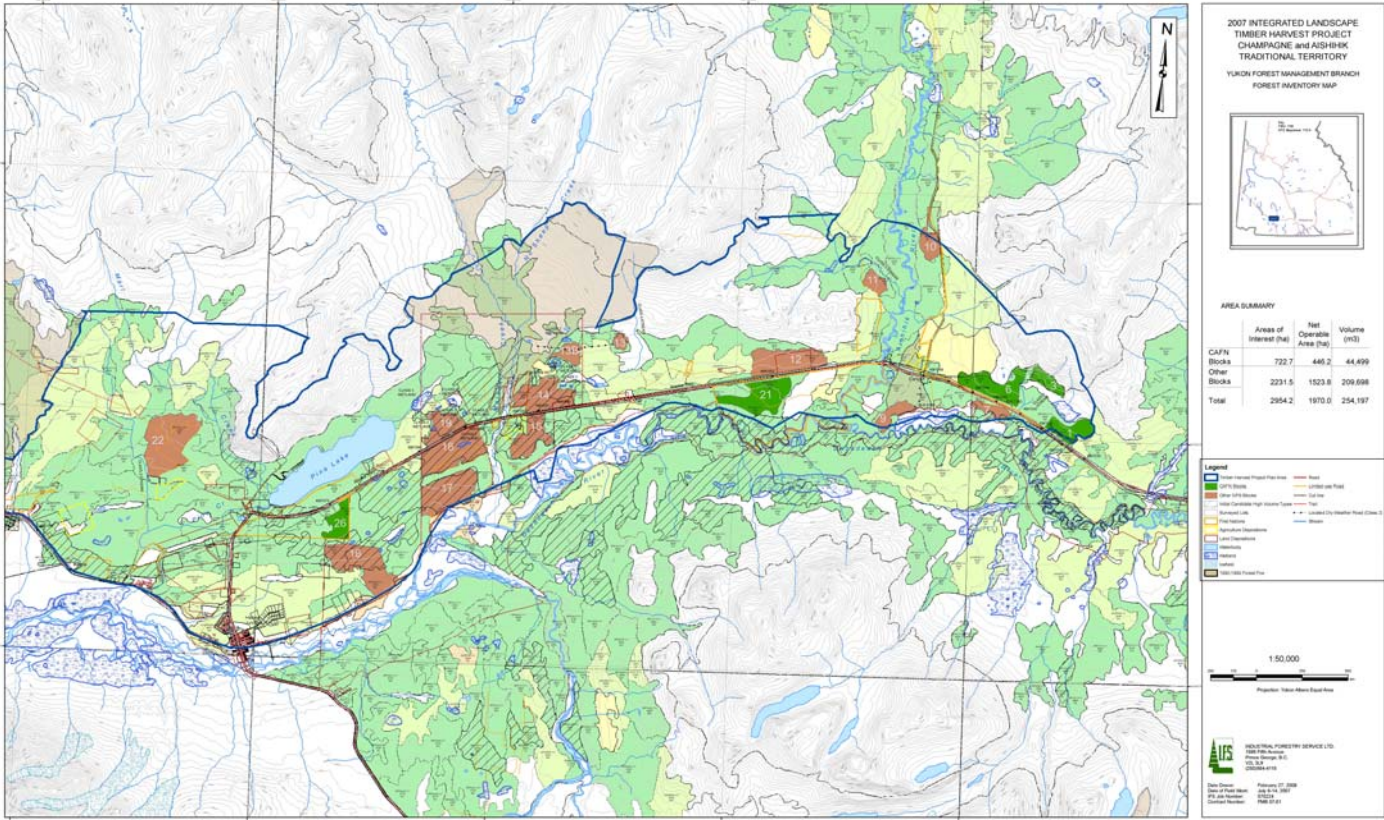
Or

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Appendix A: CATT 2008 Timber Harvest Project area map showing boundaries of Marshall Creek Forestry Reserve



Appendix B: Characteristics of harvest areas in (or near) the Marshall Creek Forestry Reserve

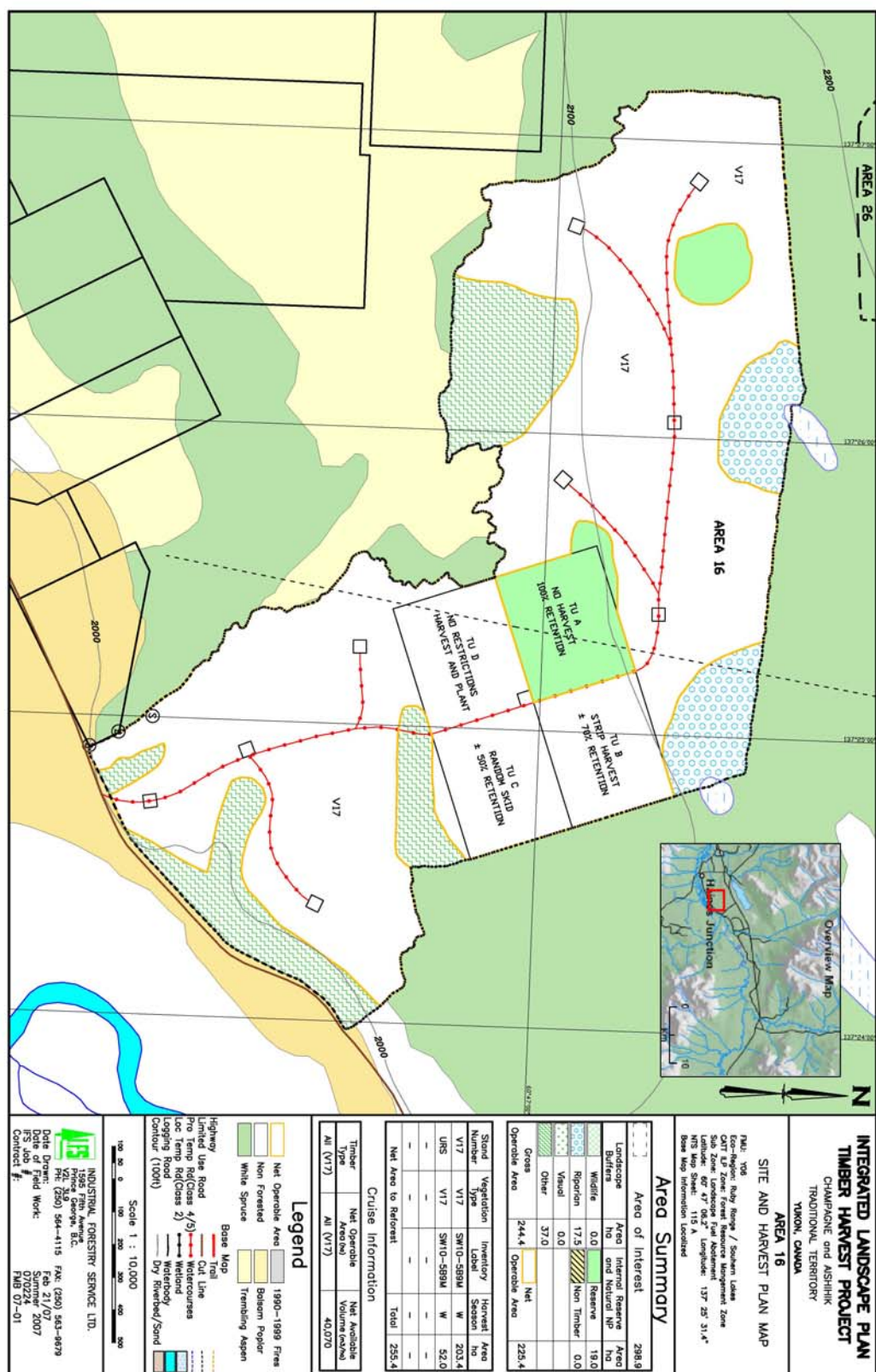
Ecological characteristics of THP harvest areas that fall in or near the Marshall Creek Forestry Reserve

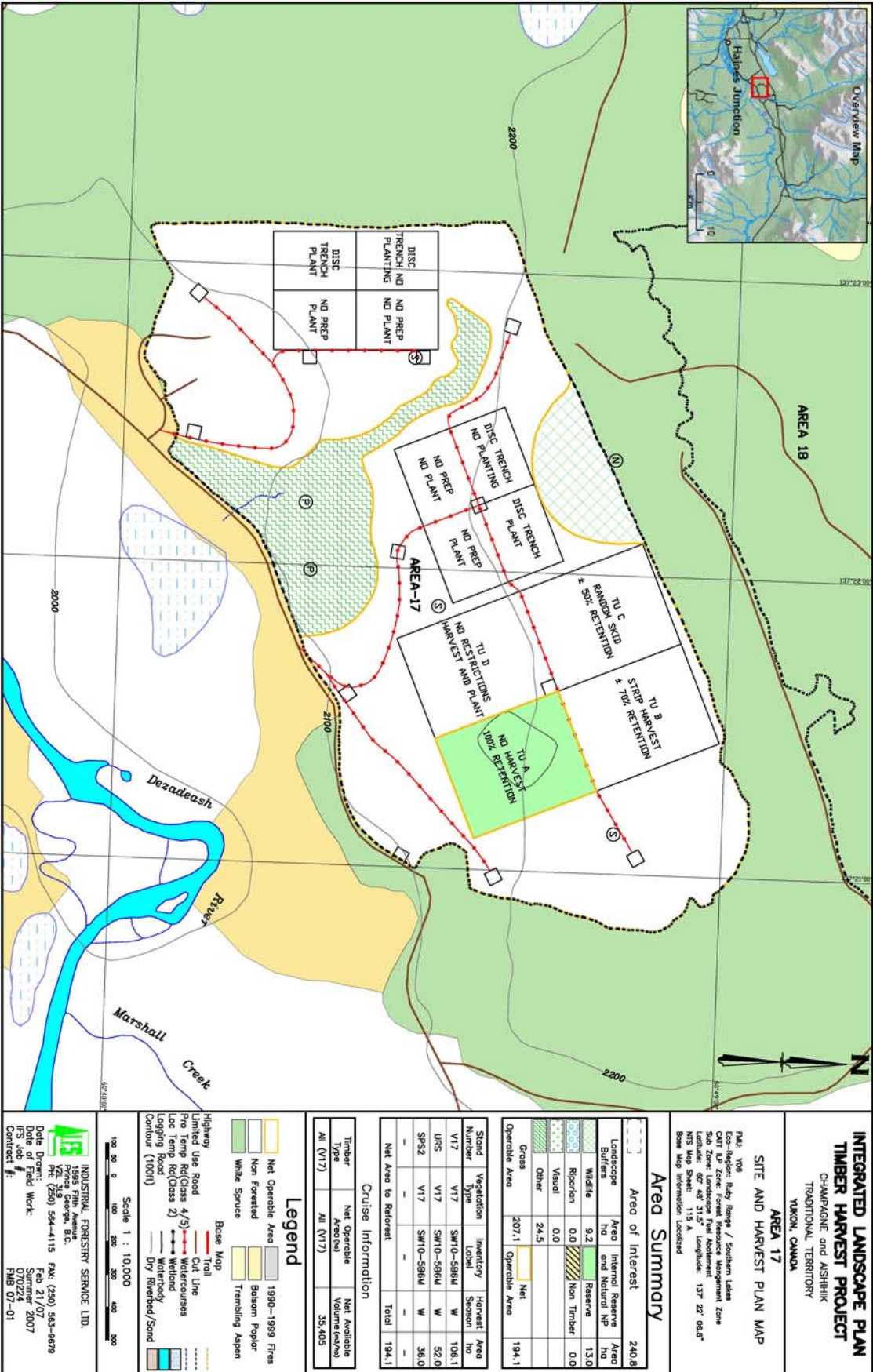
Area	Gross Operable Area (ha)	Species Composition	NDZ	Vegetation Type ²	Beetle Attack Total /Dead (%)	Terrain	Meso-Position
13	24.8	SW9A1	Simple upland	V17 – Open white spruce forest	86 / 83	Even	Mid
13b	39.5	SW10	Simple upland	V17 – Open white spruce forest	100 /83	Rolling	Mid
14	165.7	SW10	Simple upland	V17 – Open white spruce forest	75 / 60	Even	Level
15	98.9	SW10	Simple upland	V17 – Open white spruce forest	100 / 62	Even	Level
16	244.4	SW10	Simple upland	V17 – Open white spruce forest	90/81	Even	Level
17	207.1	SW10	Simple upland	V17 – Open white spruce forest	87 / 54	Even	Level
18	159.8	SW8A2	Simple upland	V17 – Open white spruce forest	78 / 64	Even	Level
19	68.1	SW9A1	Simple upland	V17 – Open white spruce forest	86 / 57	Even	Level

Soil characteristics of THP harvest areas that fall in or near the Marshall Creek Forestry Reserve

Area	Average slope (%)	Soil Type ²	Parent Material	Moisture Regime	Soil Drainage	Soil Nutrient Regime	Duff Depth / Soil Texture / % CF
13	5	S10 (Moist / Fine Loamy-Clayey)	Morainal	Moist	ModWell	Medium	14cm SiCL 20%
13b	6	S4 (Fresh / Silty-Silt Loamy)	Morainal	Fresh	Well	Medium	8cm SiL 20-40%
14	0-5%	S3 (Fresh / Coarse Loamy) - S6 (Fresh / Clayey)	Glaciofluvial and glaciolacustrine	Very fresh-very moist	Well-Imperfect	Medium	8cm L-Si-SiS-SiC <5%
15	2%	S5 (Fresh / Fine Loamy)	Glaciofluvial and glaciolacustrine	Fresh	Well-ModWell	Medium	8cm Cl-SiCL 0-40%
16	2%	S6 (Fresh / Clayey)	Glaciofluvial and glaciolacustrine	Moist	ModWell-Imperfect	Medium	9cm SiC-C <5%
17	2%	S6 (Fresh / Clayey)	Glaciofluvial and glaciolacustrine	Fresh	Well-ModWell	Medium	9cm SiC-C <5%
18	4%	S3 (Fresh / Coarse Loamy) - S6 (Fresh / Clayey)	Glaciofluvial and glaciolacustrine	Very fresh-very moist	Well-Imperfect	Medium	12 cm SiL-SiC 0-10%
19	3%	S9 (Very Moist / Silty-Silt Loamy) – S10 (Moist / Fine Loamy-Clayey)		Moist	ModWell	Medium	11cm SiL-SiCL <5%

² Zoladeski *et al*, 1996







APPENDIX D

Local Level Indicators of Sustainable Forest Management in the Champagne and Aishihik Traditional Territory:

An Assessment of the 250,000 m³
Pine/Canayon Timber Harvest Project

**Local Level Indicators of Sustainable Forest Management
in the Champagne and Aishihik Traditional Territory:
An Assessment of the 250,000m³ Pine/Canyon Timber Harvest Project**

June, 2008

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1.0 Introduction

Indicators provide a practical means for assessing forest management activities against specific local expectations and a broad range of values. When associated with forest management goals and objectives, indicators are used to answer the question “are we achieving the goals and objectives of forest management?” Indicators are a critical part of monitoring programs and, if supported by good information – both scientific and measurable observations and traditional and local descriptive observations and perspectives – can provide an early indication of where changes may be required in forest management.

The *Strategic Forest Management Plan for the Champagne and Aishihik Traditional Territory: Community Directions for a Sustainable Forest* (SFMP) includes an extensive list of indicators that tell managers how forestry activities will be evaluated and how their efforts will be judged by the broader community. In addition, the Integrated Landscape Plan (ILP) for the Champagne and Aishihik Traditional Territory (CATT) provides guidance on a number of thresholds that forestry development should not exceed. Reporting on these thresholds provides an indication of how well planned forestry developments are meeting guidance provided by the ILP.

The purpose of this report is to evaluate how well the planned 250,000 m³ Pine/Canyon Timber Harvest Project (THP) meets the goals and objectives of the regional SFMP. To do this, this report assesses the influence of the planned THP on a selected list of indicators of sustainable forest management as defined by the SFMP. In addition, this report provides an assessment of the THP with respect to thresholds defined by the ILP.

This report provides the following: background information that describes direction from the higher-level plans in the Champagne and Aishihik Traditional Territory (CATT) that describe the context within which this analysis was carried out; a description of the methodology we followed to select and report on indicators; the results of our analysis on the status of selected indicators including an assessment of the baseline status of the indicators and an assessment of changes in the status of indicators in light of the proposed THP development; and conclusions and recommendations arising from this work.

2.0 Background

The following background describes the context within which this analysis was carried out. An overview of the sustainable forest management planning process in the Yukon is provided along with a summary of key direction from the SFMP and ILP that pertains to monitoring and reporting on indicators.

2.1 Sustainable Forest Management Planning in the Yukon

Forest management planning in the Yukon involves several distinct planning stages that gradually narrow the decisions and direction from the general goals through basic landscape level arrangements down to specific harvest area location and design. This overview is important to an understanding of how indicators can be used to explain how lower level plans meet the goals and objectives established by higher level plans. The steps involved in sustainable forest management planning are described in Table 1 below.

Table 1: Steps involved in sustainable forest management planning in the Yukon

Planning Level	Key Planning Outcomes
Strategic Forest Management Plan	<ul style="list-style-type: none">• Statement of what issues, concerns, values and interests must be addressed in subsequent planning stages• Forest management directions based on a general consensus between governments and people within the Traditional Territory• Establishes the public benchmarks against which regional forest management and planning should be evaluated• Recommended by the local Renewable Resource Council for approval by Yukon and First Nations governments• Plan is relevant for 20 years and has a planning horizon of two forest rotations (200-300 years)
Integrated Landscape Plan	<ul style="list-style-type: none">• Identifies broad areas available or not for forest harvesting• Provides strategies for reducing or eliminating significant negative effects of forest harvesting on other resources and values• Accompanied by a timber supply analysis followed by a determination of the harvest level for the planning region• Plan is relevant for a 5-20 year period.
Timber Harvest Project	<ul style="list-style-type: none">• Designs harvest activities (e.g. location of harvest areas and main roads)• Consistent with direction from higher level plans (SFMP and ILP)• Plan generally applies for a period of 5 years
Site Plan	<ul style="list-style-type: none">• Provides detail of the harvest area boundaries and landings, refined volume estimates and exact road locations• Describes specific operational activities including harvesting equipment, stream crossing methods etc.• Generally prepared and applied annually

2.1 The CATT Strategic Forest Management Plan

In December 2004, the SFMP was jointly approved by the Champagne and Aishihik First Nations Government (CAFN), and the Government of Yukon (GY) and was recommended for approval and implementation by the Alsek Renewable Resource Council (ARRC). Elements of the plan that provide important background to this indicator report are summarized below.

2.1.1 Goals, objectives, indicators

The SFMP specifies four goals for sustainable forest management in the CATT; Goal A: Functioning forest ecosystems, Goal B: Community sustainability and benefits, Goal C: Cooperative forest management and Goal D: Building local human capacity. For each goal, a number of management objectives are specified. Together, the goals and objectives reflect the values and concerns of people living in the region and establish the direction and conditions for regional forest management. The SFMP specifies 103 indicators of sustainable forest management for the CATT. Reporting on status and trends in indicators facilitates an understanding of progress that is being made on achieving the goals and objectives of the plan.

2.1.2 Monitoring and reporting on SFMP indicators

The CATT SFMP is a dynamic document that must be responsive to a changing environment and changing needs and values. It requires monitoring, periodic review and revisions. As such, the plan provides direction regarding plan monitoring and review. The plan instructs that a monitoring report shall be developed that reviews and compiles indicator information and assesses how well the plan is meeting its objectives. CAFN and Forest Management Branch are responsible for collecting and compiling indicator information and raising issues that need to be addressed. Other organizations and agencies may be invited to contribute related information as well as assist in the determination of indicators and the means by which monitoring is conducted that may assist in plan monitoring. Following the release of the monitoring report, the ARRC shall convene a meeting to review the report and to solicit public comment. The meeting will be an opportunity for the public to raise issues that may require update or amendment of the forest plan.

2.1.3 Initial Status Report

The purpose of an *Initial Status Report* (ISR) is to report on the status of the indicators prior to implementation of the SFMP. An Initial Status Report provides useful baseline information that future monitoring and reporting of indicators can be compared against. This report, which is currently in preparation for the CATT, also shares lessons learned from the development of this report that may be useful to consider when planning monitoring activities and compiling future monitoring reports.

2.1.4 Adaptive management

The SFMP explicitly incorporates a commitment to adaptive management. Adaptive management involves monitoring the effects of forest management activities and modifying practices as necessary to ensure that objectives are being met. An important part of adaptive management is the development, tracking and reporting of local level indicators. They are a key tool in measuring the effectiveness of

Figure 1: Adaptive Management



forest management strategies in the region in achieving management objectives and therefore to adaptive management.

2.2 The CATT Integrated Landscape Plan (ILP)

In February 2007, the ILP was approved. This plan is a landscape level technical planning and operating tool that is the primary document to be used for guiding the development of timber harvesting and/or fuel abatement projects. In conjunction with the SFMP, the ILP provides management priorities and guidelines for timber harvest project planning in the CATT. The ILP shows where timber harvest project activities can or cannot occur. Three management zones were created that refines the zoning and priorities from the SFMP. The ILP also provides resource management guidelines for Timber Harvest Projects. This direction is useful to interpreting what considerations a change in indicator status may pose to forestry activities. The ILP provides guidance on a number of resource management thresholds or levels that an indicator should not exceed (Figure 2). In some cases these thresholds further refine direction provided in the SFMP on indicators; in other cases these thresholds are additional indicators to the list provided in the SFMP.

Figure 2: Guidance on forest management thresholds in the CATT ILP

Timber Harvest Projects

- Forest harvesting priorities are primarily focused on the salvage of spruce bark beetle-affected stands with greater than 30% mortality
- The size of harvest blocks can vary between 1 and 200 ha

Forest Ecosystems, Wildlife and Biological Diversity Guidelines:

- Ensure no more than **50%** of the forested area of each eco-region and eco-district is harvested
- Ensure that no single forest site class is **disproportionately** harvested within the CATT during the ILP timeframe.
- High wildlife areas should **average 25%** retention of stand structure; the range of retention can be 10-30% stand structure depending on site characteristics.

Watershed and Riparian Management Guidelines

- Landscape areas where more than **20%** of the watershed is proposed for harvest should be assessed for unacceptable changes in water quality and quantity.

Access Management Guidelines

- Minimize the total area affected by skid trails in the harvest blocks to **7%** of the total block area
- Limit line of sight, when possible, to no more than **400m** along main roadways
- In absence of information on the potential impacts on forestry road development on wildlife, forestry planning should consider the following access density thresholds for grizzly bear management: **0.16km/km² at the planning area level** and **0.40 m/km² at the operating unit level.**

3.0 Methodology

This assessment involved carrying out three tasks which are described in greater detail below: 1) selecting indicators, 2) assessing the baseline status of those indicators and 3) assessing changes in the status of indicators in light of the proposed THP development.

3.1 Selecting indicators

This report contains an assessment of the status of a select list of indicators from the SFMP and thresholds in the ILP. We reviewed the entire list of indicators and thresholds and identified those that may change in status due to the proposed THP development. We narrowed this list down further by identifying those indicators and thresholds for which we have data and were able to perform reliable analysis on the impact of the proposed THP development on the status of these indicators/thresholds. For the most part, our analysis was constrained to GIS-based analytical tools and techniques; therefore, this report is not a comprehensive report on the impact of the proposed THP on all indicators of sustainable forest management that are outlined in the SFMP. Monitoring post-harvest will be required to make an assessment on the impact of the THP on many of the SFMP indicators.

3.2 Assessing the baseline status of indicators

We assessed the baseline status of the indicators. Baseline status is defined as the status of indicators without any consideration of the proposed THP development. The baseline information provides important context for interpreting any changes in the status of indicators resulting from the proposed THP development.

3.3 Assess the status of indicators with THP development

The purpose of this step was to assess what influence the THP has on the baseline status of the indicators. We used information provided in the *Champagne and Aishihik Traditional Territory Regional Timber Harvesting Project Consultation Draft* dated May 2008 to conduct this analysis.

4.0 Results

The following SFMP indicators and ILP thresholds are reported on:

SFMP Indicators

- Area of disturbance by disturbance type
- Age class distribution
- Level of compliance with water protection guidelines
- Proportion of area commercially harvested to the land base available for timber harvest planning
- Road density
- Status of areas of suitable habitat for existing and potential movement corridors

ILP Thresholds

- Road density
- Amount of harvested area in each eco-region and eco-district
- Percent of area harvested on good, medium and poor sites
- Proportion of landscape unit affected by substantial stand replacing disturbance in the last 20 years.
- Level of spruce-beetle mortality in harvest areas
- Harvest area size
- Amount of retention in harvest areas that are located within high wildlife value areas
- Amount of area harvested in fuel abatement zones

4.1 SFMP Indicator: Area of disturbance by disturbance type

Link to higher level plans

This indicator reports on the forest management objective of to support the ecosystem's ability to maintain natural processes under SFMP Goal A which is to maintain the function and integrity of forest ecosystems.

Landscape Unit	Disturbance Type (ha)				
	Spruce bark beetle (1990-2007)	Ips beetle (2005-2007)	Total area burned (1990-2007)	Timber harvesting (1990-2007)	THP (Net Operable Area)
Canyon	11,585	0	701	0	899
Pine Lake	23,619	812	3,852	114	1,156
Haines Road North	26,378	15	0	*1019	0
Kloo Lake East	18,834	103	2,773	10	0
Game Sanctuary North	20,345	1,407	0	21	0
CATT Total	380,000	3,529	8,827	1,164	2,055

*The Quill Creek Timber Harvest Project, located in the Haines Road North Landscape Unit, has been approved for harvest. At the time that this report was released, some but not all of this area has been harvested.

Baseline status

Only those landscape units where there has been forest harvesting have been reported on here. In addition, the total area disturbed in the CATT by disturbance type is also provided. Four types of forest disturbance have been documented in the CATT. Since 1990, the spruce bark beetle infestation is the greatest natural disturbance at 380,000 ha, followed by wildfires at 8,827 ha, Ips beetle at 3,529 ha and timber harvesting at 1,164 ha. The figure for timber harvesting includes areas that are part of the Quill Creek Timber Harvest Project in the Haines Road North landscape unit which has been approved for harvest but not all of this area has been harvested. The spruce beetle infestation is linked to favourable forest and climatic conditions. Historically, the probability of wildfire in this region has been low relative to other areas in Yukon and across the boreal forest.

Change in status with THP development

The Timber Harvest Project plans for a harvest of 2,055 ha of spruce-beetle affected forests. This is 0.52% of the total spruce beetle affected area.

Forest management considerations

Natural disturbances are an important part of the healthy functioning of boreal forest ecosystems. Forests in this region recover relatively slowly from disturbance. Therefore, the CATT has a high level of "landscape memory" in that forest disturbances are visible on the landscape for very long periods of time. A healthy forest is a resilient forest, meaning it can deal with change and disturbance without losing its basic productivity. Human activities, if not carefully managed, can add to the stresses that a normal forest ecosystem experiences and may reach the point where productivity and resilience starts to decline. One widely proposed approach to ecosystem-based management is the emulation of natural disturbances. In this approach it is critical to understand the natural variability in the disturbance regime. As agents of forest disturbance, spruce beetle outbreaks and forest fires have very different ecological effects.

4.2 SFMP Indicator: Age class distribution

Link to higher level plans

This indicator reports on the forest management objectives to support the ecosystem's ability to maintain, restore or enhance forest ecosystem function. This objective relates to SFMP Goal A which is to maintain the function and integrity of forest ecosystems.

Baseline status

Examining the area of forest by age class helps measure ecosystem diversity within the region. The table shows the age class distribution of areas targeted by the current THP and past harvesting areas in the CATT as well as the age class distribution of the remaining forests. Forests in the CATT are not diverse; they are largely characterized by an open canopy of mature white spruce with an understory of deciduous shrubs. There is little variation in species composition and 70% of the forest is greater than 80 years old. The total harvested area for the whole CATT outside of Kluane National Park and Reserve is 145 ha as of 2005.

Age Class (years)	Past Harvesting (1990 – 2006)	THP (Net Operable Area)	Remaining Forests
0 to 20	11	0	6,054
21 to 40	0	9	6,532
41 to 60	0	33	13,429
61 to 80	13	341	20,819
81 to 100	165	1,031	13,066
101 to 120	362	461	15,363
121 to 140	324	32	4,275
141 to 160	101	0	3,131
161 to 180	179	0	331
181 to 200	0	45	50
200+	0	0	0

*The Quill Creek Timber Harvest Project, located in the Haines Road North Landscape Unit, has been approved for harvest. At the time that this report was released, some but not all of this area has been harvested. This area is accounted for under past harvesting areas.

Change in status with THP development

Seral stages of the forest will become more varied once harvesting occurs as there will be more forested area in the younger age classes. The THP plans to allow the removal of 2000 ha of timber; this will involve harvesting 341 ha of forest that is the age class of 61 to 80, 1,031 ha of forest that is in the age class 81-100, and 461 ha of forest in the age class 101 to 120, along with smaller amounts in a few other age classes. The year in which an area is harvested is when the forest inventory records the area as being at age class 0.

Forest management considerations

A major factor contributing to the current spruce bark beetle epidemic is the relatively even-aged white spruce stands that dominate the landscape in the area. Sustainable forest management activities include a focus on the maximum sustainable harvest of timber. This is not attainable in this region now due to the high levels of conifer mortality. Achieving sustainable forestry will be an important work in progress if the necessary conditions to support it are to be realized. This will require a carefully considered, action oriented approach to forest renewal. This should create forests more resilient to disturbances by promoting a mosaic of species across the landscape using an ecologically and socially appropriate design.

4.3 SFMP Indicator: Level of compliance with water protection guidelines

Link to higher level plans

This indicator reports on the forest management objective to maintain naturally occurring quality and quantity of water. This objective relates to SFMP Goal A which is to maintain the function and integrity of forest ecosystems.

Baseline status

Considerable research has been conducted regarding the impacts of forest harvesting on the integrity of riparian ecosystems. When trees are harvested immediately adjacent to watercourses, effects on water volume and increased flow may be observed. This indicator assumes that the potential impacts of forestry activities on water resources will be mitigated by establishing riparian management areas (RMA'S) per guidelines in the Timber Harvest Planning and Operating Guidebook (THOPG). The THOPG recommends the RMA'S which consist of a reserve zone and a management zone within which specific forest practices are applied. The width of the zones is based on the attributes of the stream, wetland or lake and the adjacent terrestrial ecosystem.

THP Harvest Area	Stream/ Wetland Classification	THOPG RMA Guidelines* (m)	Description of how THOPG Guidelines are met in THP
13	Non-classified drainage** in northeast corner	50 (20/30)	Small non-classified drainage has been excluded in a riparian buffer.
14	Several class 2 wetlands adjacent to northeast corner	140 (60/80)	Entire riparian management area for these wetlands has been excluded from the block.
16	Non-classified wetlands	50 (20/30)	Two small wetlands adjacent to the north boundary are excluded in riparian buffers.
18	A Class 3 wetland is located in the central portion of this block.	100 (40/60)	The entire Riparian Management Area (RMA) for this wetland has been excluded from harvest in a large centrally located buffer.
19	There are two Class 2 wetlands associated with this block.	140 (60/80)	The wetland adjacent to the west boundary and its entire Riparian Management Area (RMA) has been excluded in a reserve. The wetland adjacent to the north boundary has been excluded from the block. A reserve has been located to remove its RMA from harvest.
22	There are several small Class 1 wetlands within the reserve area at the west end of the block. In addition, a Class 3 stream is located in a deep draw just outside the southwest corner of the block.	Class 1 wetland: 60 (0/60). Class 3 stream: 100 (40/60)	Some random harvesting has already occurred within the Riparian Management Zone (RMZ) of some of these wetlands. For future harvesting operations, the remainder of the RMZ is to be excluded. A buffer has been located to ensure that the entire Riparian Management Area (RMA) of this stream is excluded from harvest.

Note: Table is limited to blocks with identified watercourses, lakes or wetlands

*Total width of the riparian management area (reserve zone/management zone).

**In the THP, non-classified drainages are considered to be Class 5

Change in status with THP development

During the development of the THP, all potential harvesting areas were ground-surveyed in order to identify and classify streams, wetlands and lakes. Of the 19 areas that were identified for harvest, streams and/or wetlands were identified within 6 of these harvest areas. All of these areas are protected through the establishment of a riparian management area which consists of a reserve zone and management zone per THOPG guidelines as noted in the table. In addition to classifying and protecting watercourses, wetlands and lakes, a number of areas identified for harvest were excluded from harvest areas to further protect water values and maintain forest connectivity adjacent to riparian areas.

Forest management considerations

The THP has complied with guidelines that have been established in the Yukon for the protection of water resources through the identification and establishment of riparian management zones within harvest areas. Further research to better understand the impact of beetle disturbance, climate change and

harvesting on the hydrological regime is warranted along with research to understand the effectiveness of THOPG guidelines in meeting water protection objectives.

4.4 SFMP Indicator: Proportion of area commercially harvested to the land base available for timber harvest planning

Link to higher level plans

This indicator reports on the SFMP objective of optimizing the use of the forest land base where appropriate and desirable under Goal B: Community Sustainability and Benefits. This indicator provides an assessment of the proportion of area that has been harvested and possibly could be harvested to the land base that is available for timber harvest planning as defined by the Forest Resource Management Zone (FMRZ) in the ILP.

Baseline Status

The ILP defined zones where Timber Harvest Project activities can or cannot occur. The ILP established a Forest Resource Management Zone (FMRZ); timber harvest planning and development can occur in this zone which is also referred to as the “Green” zone. To date, most landscape units have not seen any commercial harvesting within their “Green” zones. However, there has been a history of small-scale forest harvesting within the FMRZ in four landscape units: Haines Road North (1,019 ha), Pine Lake (114 ha), Kloo Lake East (10 ha) and Kluane Wildlife Sanctuary North (21 ha). The figure for the Haines Road North landscape unit includes the Quill Creek Timber Harvest Project which has been approved for harvest but not all of this area has been harvested.

Landscape Unit	Area (ha)			Proportion of Area (%)		
	Total Forest Area in “Green” Zone	Past Harvesting (1990 – 2007)	THP (Net Operable Area)	Past Harvesting (1990 – 2007)	THP (Net Operable Area)	Total (Past Harvesting and Current THP)
Canyon	10,925	0	899	0	8	8
Pine Lake	14,755	114	1,156	1	8	9
Haines Road North	18,741	*1,019	0	*	5	5
Kloo Lake East	14,252	10	0	<1	0	<1
Game Sanctuary North	2,429	21	0	<1	0	<1
Entire “green” zone in CATT	93,794	1,164	2,055	1	2	3
Entire forest area in CATT (including KNP)	397,120	1,164	2,055	<1	<1	<1

*The Quill Creek Timber Harvest Project, located in the Haines Road North Landscape Unit, has been approved for harvest. At the time that this report was released, some but not all of this area has been harvested.

Change in status with THP development

The THP is proposing to harvest a total of 2000ha that is almost equally divided between the Canyon and Pine Lake landscape units. Harvesting that is proposed is 8% of the “Green” zone or FMRZ in the Canyon landscape unit and 8% of the FMRZ in the Pine Lake landscape unit. Across the “Green” zone in the CATT, 3% is either harvested or planned for harvest; this is less than 1% of the total forest area in the CATT.

Forest management considerations

This indicator is an important measurement tool for assessing the extent of forest harvesting within the region. It also indicates whether a particular zone is undergoing too much forest harvesting that it cannot sustain its ecological functions or support wildlife that dependent on it.

4.5 SFMP Indicator and ILP Threshold: Road density

Link to higher level plans

This indicator reports on the forest management objective to maintain commercial wilderness tourism values and revenue generating activities and opportunities by managing cumulative access impacts on pristine values during timber harvest planning. This objective is under Goal B of the SFMP which is to encourage the development of a forest-based economy that maintains or enhances the long-term social and economic well being of forest users and local communities in the region. This indicator also reports on a number of forest management objectives under SFMP Goal A which is to maintain the function and integrity of forest ecosystems. The ILP provided guidance for how to mitigate the potential impacts of forestry road development on wildlife. Access density thresholds for grizzly bear management were suggested -- 0.16 km/km^2 at the planning area level and 0.40 km/km^2 at the operating unit level.

Landscape Unit	NTS Feature (km)				Existing Logging Roads 1990 - 2006 (km)	Roads Proposed in THP (km)	Total Length (km)	Total Area (km ²)	Density (km/km ²)
	Road	Limited Use	Trail	Cut-line					
Canyon	83	48	16	30	0	20	197	900	0.2
Pine Lake	36	35	21	15	18	30	155	455	0.3
Haines Road North	39	21	4	0	38	0	102	461	0.2
Kloo Lake East	22	12	19	11	3	0	67	418	0.2
Game Sanctuary North	16	39	21	6	1	0	83	582	0.1
Entire CATT Planning Area	354	364	482	88	22	88	1,398	19,593	0.07

Note: Not all existing trails are accounted for in the GIS database and for some roads there is not have enough detail for us to be able to precisely measure road lengths.

Baseline status

Road density is a commonly used indicator of cumulative access impacts on pristine values. The table provides the estimated length and density of roads including highways, limited use roads, trails and cutlines for those landscape units that have been or are proposed for harvest.

Change in status with THP development

Currently, all 19 harvest areas are proposed for winter harvest with the exception of area 9, which allows for dry summer harvesting, and area 13B which allows for summer harvest to facilitate a proposed research study on winter vs. summer harvesting. A winter harvest means operators can build temporary roads which will be decommissioned when harvesting is complete. Most of the proposed harvesting areas are adjacent to existing roads. Where possible, existing trails are utilized to access harvesting areas reducing the need to build new roads. With the additional roads associated with the THP, the road density of 0.07 for the entire CATT planning area is below the suggested access density threshold of 0.16 km/km^2 at the planning area level. In addition, the landscape units that are proposed for harvest within the new THP will have road densities that are below the suggested access density threshold of 0.40 km/km^2 for grizzly bear management at the operating unit scale.

Forest management considerations

Forest management must take into account the effect of roads on wildlife, wildlife corridors, as well as opening-up access into remote areas. Therefore, threshold for road density needs to be carefully considered before additional development takes place. The fewer permanent roads created, the less access there is to fish and wildlife habitat. By reducing the number of road within the THP, impacts on the ecosystem can be mitigated. The ILP requires that any new access or changes to the existing access requires further review and approval by government and procedures will be followed as outlined in the Timber Harvest Planning and Operating Guidebook (1999). Additional research is required to understand the effectiveness of access density thresholds in maintaining biodiversity objectives and commercial wilderness tourism values.

4.6 SFMP Indicator: Status of areas of suitable habitat for existing and potential movement corridors

Link to higher level plans

This indicator reports on the forest management objective of ensuring appropriate wildlife movement corridors between important habitat and key landscape features. This objective relates to SFMP Goal A which is to maintain the function and integrity of forest ecosystems.

Baseline status

Prior to the development of the THP, little information was available regarding existing and potential movement corridors for the CATT or where to place corridors in planning a timber harvest project.

Change in status with THP development

With the initiation of this THP, interest in connectivity planning for wildlife in the CATT was heightened. An interagency project team consisting of members of agencies with the mandate to manage wildlife and wildlife habitat in the CATT was established to provide information and expert advice on connectivity planning for the CATT. The project team chose focal species whose connectivity needs, if managed appropriately, would benefit the greatest number of species. Based on a literature review, general data availability, knowledge of members of the project team and knowledge of key local contacts, two mammals (Grizzly Bear and Moose), an old forest guild of species and fish were selected as focal species. The project team generated a report, map and 22 management recommendations that pertain to connectivity planning for these species.

Forest management considerations

Habitat connectivity planning recommendations have now been developed for timber harvest planning in the CATT. Further research is needed to determine the effectiveness of these recommendations in ensuring wildlife movement between important habitat and key landscape features. A monitoring program is needed to be able to assess effectiveness.

4.7 ILP Threshold: Amount of harvested area in each eco-region and eco-district

Link to higher level plans

This indicator reports on the forest management objective to protect fish and wildlife populations and their habitats under SFMP Goal A which is to maintain the function and integrity of forest ecosystems. The ILP also recommends a threshold that pertains to this indicator. The ILP states that no more than 50% of the forest area in each ecoregion and ecodistrict, as they occur within the CATT, be planned for forest harvesting.

Amount of harvest area in each ecoregion

Ecoregion	Area (ha)			Percent of area (%)		
	Total Forest Area	Past Harvest (1990 to 2006)	THP (Net Operable Area)	Past Harvest (1990 to 2006)	THP (Net Operable Area)	Past Harvest and THP
St. Elias Mountains	15,390	0	0	0	0	0
Ruby Range	232,469	1096	233	<1	<1	<1
YT Southern Lakes	98,605	68	2303	<1	2	2
YT Stikine Plateau	49,057	0	0	0	0	0
Klondike Plateau	2,630	0	0	0	0	0

Amount of harvest area in each ecodistrict

Ecodistrict	Area (ha)			Percent of area (%)		
	Total Forest Area	Past Harvest (1990 to 2006)	THP (Net Operable Area)	Past Harvest (1990 to 2006)	THP (Net Operable Area)	Past and Planned Harvest
29	55	0	0	0	0	0
35	2,648	0	0	0	0	0
36	9,657	0	0	0	0	0
37	131,048	1096	233	<1	1	1
41	73,851	0	0	0	0	0
44	1,647	0	0	0	0	0
46	86,285	68	2,303	<1	3	3
49	15,265	0	0	0	0	0
51	10,673	0	0	0	0	0
58	49,057	0	0	0	0	0
77	15,390	0	0	0	0	0
0	2,573	0	0	0	0	0

*The Quill Creek Timber Harvest Project, located in the Ruby Range Ecoregion in Ecodistrict #37, has been approved for harvest. At the time that this report was released, some but not all of this area has been harvested. Planned harvest refers to the net operable area in the THP.

Baseline status

The CATT is comprised of portions of 4 ecoregions. Ecoregions are unique parts of the landscape characterized by distinctive physiography (landforms) and climate. Ecoregions are then subdivided into Ecodistricts which are defined by similar assemblages of geology, landforms, soils and vegetation of which there are 12 in the CATT (the ecodistricts do not have names). In the CATT there has been a history of small-scale timber harvesting in two ecoregions and two ecodistricts.

Change in status with THP development

The area proposed for THP development falls within the Ruby Range and Yukon Southern Lakes Ecoregions, in Ecodistricts 37 and 46. Considering both past and planned harvesting in the CATT, the total area harvested and planned for harvest is <1% in the Ruby Range Ecoregion, 2% in the Yukon Southern Lakes Ecoregion, 1% in Ecodistrict #37 and 3% in Ecodistrict #46. This is well under the ILP threshold.

Forest management considerations

Maintaining the function and integrity of forest ecosystems is achieved by conserving forest productivity and biodiversity and related waters, soils, ecosystems and landscapes. A healthy forest is also resilient,

meaning it can deal with change and disturbance without losing its basic productivity. Human activities, if not carefully managed, can add to the stresses that a normal forest ecosystem experiences and may reach the point where productivity and resilience starts to decline. The scale of salvage harvesting proposed by the THP falls within guidelines recommended by the ILP to ensure normal forest ecosystem function.

4.8 ILP Threshold: Percent of area harvested on good, medium and poor sites

Link to higher level plans

This indicator reports on the objective of supporting the ecosystem's ability to maintain natural processes under SFMP Goal A which is to maintain the function and integrity of forest ecosystems. The ILP also recommends a threshold that pertains to this indicator. The ILP recommends that timber harvest planning ensure that no single forest site class is disproportionately harvested within the CATT during the ILP timeframe.

Landscape Unit	Good Productivity			Medium Productivity			Poor Productivity			Low Productivity		
	Past	THP	Past + THP	Past	THP	Past + THP	Past	THP	Past + THP	Past	THP	Past + THP
Canyon	0	0	0	0	7	7	0	3	3	0	<1	<1
Pine Lake	0	0	0	0	7	7	1	8	9	0	1	1
Haines Road North	0	0	0	0	0	0	4	0	4	6	0	6
Kloo Lake East	0	0	0	0	0	0	<1	0	0	0	0	0
Game Sanctuary North	0	0	0	9	0	0	0	0	0	0	0	0
Entire CATT**	0	0	0	<1	2	2	<1	1	1	0	<1	<1

*The Quill Creek Timber Harvest Project, located in the Haines Road North Landscape Unit, has been approved for harvest. At the time that this report was released, some but not all of this area has been harvested. This area is accounted for under past harvesting.

**The 109,000 ha inside the park was not included in the calculation as it would result in percentages <1% for the entire CATT.

Baseline status

Site index is used to measure forest productivity. It provides a means to compare the productivity of different sites by using tree age and height. Site index provides an estimate of the maximum height of the leading species when a stand is 100 years of age. The vast majority of forests in the CATT (83%) are classified as having poor productivity. Only 0.1% of the forests in the CATT are classified as having good productivity. The low productivity can be explained by climate, soil conditions, and topographic relief. The table shows percent harvested in each landscape on various site classes (also known as forest productivity estimate classes). This data is from the Yukon forest cover inventory. In the past, no harvesting has been targeted on sites with good productivity. Harvesting has taken place on 4% of sites with medium productivity and 6% of sites with low productivity in the Haines Road North landscape unit, <1% of poor sites in the Kloo Lake East landscape unit, 9% of medium sites in the Game Sanctuary North landscape unit and 1% of poor sites in the Pine Lake landscape unit.

Change in status with THP development

The THP is targeting harvesting in two landscape units, Canyon and Pine Lake. Harvesting is planned for 7% of sites with medium productivity and 3% of sites with poor productivity in the Canyon landscape unit, and 7% of medium sites and 8% of poor sites in the Pine Lake landscape unit.

Forest management considerations

While the ILP has not provided a specific definition for disproportionate, it does not appear that timber harvesting has disproportionately targeted site classes within the CATT. Due to logistical and physical barriers it has been difficult to accurately measure site index within the CATT. Presently site index is measured through aerial surveys, therefore only rough estimates are obtained. Site index may not be the best source of data for monitoring the change of the productive landbase over time. For example, some areas with a poor site index may have small patches of very productive sites for timber.

4.9 ILP Threshold: Proportion of landscape unit affected by substantial stand replacing disturbance in the last 20 years.

Link to higher level plans

Substantial stand replacing disturbance has been examined for landscape units within the Champagne Aisihik traditional territory where there has been harvesting over the last 20 years or where harvesting is planned under the current THP. Substantial stand replacing disturbances are defined here as those that result in significant structural changes to forest ecosystems and substantial removal of the forest canopy – e.g. forest fires and timber harvesting. Therefore the primary disturbance type in the CATT, the spruce beetle infestation (see Section 4.1), is not included in this calculation. The ILP provides direction that landscape areas where more than 20% of the watershed is proposed for harvest should be assessed for unacceptable changes in water quality and quantity. In the CATT, landscape units roughly follow watershed boundaries.

Landscape Unit	Disturbance (percent)			Total area affected by substantial stand replacing disturbance	
	Total Area Burned (1988 – present)	Past Harvesting (1988 – 2006)	THP (Net Operable Area)	Baseline status	THP (Net Operable Area)
Canyon	2	0	3	2	5
Pine Lake	26	<1	8	26	32
Haines Road North	0	4	0	4	4
Kloo Lake East	17	<1	0	17	17
Game Sanctuary North	0	<1	0	<1	<1
Entire CATT Planning Area	2	<1	<1	2	2

*The Quill Creek Timber Harvest Project, located in the Haines Road North Landscape Unit, has been approved for harvest. At the time that this report was released, some but not all of this area has been harvested. This area is accounted for under past harvesting.

*** Table reflects data from 1986 to 2006

Baseline status

Landscape units with the highest level of substantial stand replacing disturbance in the past 20 years are Pine Lake at 26% and Kloo Lake East at 17%. This is due to two large fires that burned within these landscape units in the past 20 years. Both fires were in 1998 – the Marshall Creek Fire in the Pine Lake Landscape Unit (3,700 ha) and Bear Creek Fire in the Kloo Lake East Landscape Unit (3,300 ha). The baseline status of the Pine Lake landscape is over the 20% threshold noted in the ILP; therefore, this area should be assessed to determine if this level of disturbance has resulted in unacceptable changes in water quality or quantity.

Change in status with THP development

The change in total disturbed areas following implementation of the THP will be negligible if measured across the CATT. In the Canyon landscape unit, the area affected by substantial stand replacing disturbance will increase from 2% to 5%. In the Pine Lake landscape unit disturbance will increase from 26% to 32%.

Forest management considerations

Since the threshold of 20% of a watershed substantial stand replacing disturbance within the Pine Lake landscape unit has been exceeded, watercourses in this unit should be assessed to determine if this level

of disturbance has led to unacceptable changes in water quality and quantity. If the assessment determines that unacceptable changes in water quality or water quantity have occurred, mitigative measures such as delaying harvesting until water quality and quantity improve and/or employing silvicultural measures to enhance regeneration in disturbed areas could be considered.

4.10 ILP Threshold: Level of spruce-beetle mortality in harvest areas

Link to higher level plans

The SFMP provides strategic direction for salvage harvesting of spruce beetle infested stands in the CATT to reduce community risk of wildfire and provide economic opportunities from the harvest of beetle infested timber. In addressing concerns of increased uncertainty about fire risk and forest management strategies identified in the SFMP, the ILP guides timber harvest project plans to focus harvesting activities on beetle-killed or infected areas in the CATT and specifies that areas within the Forest Resource Management Zone that have a high degree of mortality (> 30%) as a result of spruce beetle infestation be targeted for harvest.

Baseline status

Since 1994, an annual aerial survey has been carried out to map the location and severity of the spruce beetle infestation in the CATT. The results of these aerial surveys are summarized in the annual Yukon Forest Health Report. During the preparation of a THP more field surveys of beetle mortality are carried out that provide more detailed information on the level of spruce-beetle mortality in a stand than can be provided by the aerial surveys. Other field-based mortality assessments have been carried out in the CATT by a variety of research and monitoring projects including the operational timber cruise that was carried to assist in identifying an interim wood supply area in Quill Creek (Haines Road North Landscape Unit). Areas identified for harvest in the Quill Creek area indicated a range of 83 to 100% (average 98%) attack rate by spruce beetle and a range of 37-94% (average 66%) mortality rate.

Change in status with THP development

Within the THP there are nineteen areas identified for harvest in the Canyon and Pine Lake landscape units. These harvest areas ranged from 19% to 99 % (average 69%) attack rate by spruce beetle. Of those trees attacked by spruce beetle, the mortality rate ranged from 52% to 100% (average 59%). The stand level mortality rate ranged from 15% to 99% (average 59%). The THP specifies that only beetle-attacked trees will be targeted for harvesting.

Harvest Area	Level of spruce beetle attack (%)	Of those attacked, (%) that are dead	Mortality rate for the stand (%)	Above 30% threshold? (Y/N)
1	64%	76%	47%	Y
3	84%	94%	79%	Y
6	66%	71%	47%	Y
7	19%	100%	19%	N
9	46%	52%	24%	N
10	40%	55%	22%	N
11	56%	53%	30%	Y
12	48%	55%	26%	N
13	70%	100%	70%	Y
13b	99%	100%	99%	Y
14	91%	96%	87%	Y
15	77%	88%	68%	Y
16	81%	90%	73%	Y
17	84%	82%	69%	Y
18	89%	85%	76%	Y
19	83%	94%	78%	Y
21	64%	88%	56%	Y
22	82%	90%	74%	Y
26	75%	100%	75%	Y
Average attack rate: 69%				
Average mortality rate of attacked trees: 83%				
Average stand-level mortality rate: 59%				
Harvest blocks that are above 30% mortality threshold: 79%				

Forest management considerations

For 79% (15 of 19) of the blocks in the THP, the ILP guideline of targeting areas with more than 30% mortality for harvesting has been met. Ongoing monitoring of spruce beetle mortality is warranted.

4.11 ILP Threshold: Harvest area size

Link to higher level plans

ILP guidelines for timber harvest project planning recommend that the size of harvest areas vary between 1 and 200 ha. This guideline was put in place to help ensure that harvest blocks have shapes and sizes that emulate the natural disturbance patterns of the area.

Baseline status

Harvesting areas in the Quill Creek THP ranged from 3.4 to 88.6 hectares in size with an average size of 26.7 ha. Harvesting areas in the McIntosh THP ranged from 1 ha to 20 ha in size. In the Marshall Creek THP harvesting areas ranged in size from 1 ha to 18 ha.

Change in status with THP development

The net operable areas of harvest areas designed for the CATT THP range from 24.8 to 255.7 hectares and have an average size of 103 hectares. The net operable area of two of nineteen proposed harvest areas (11% of blocks) exceeds 200 ha in size.

Forest management considerations

The THP has succeeded in meeting the ILP guideline for harvest area sizes by 1) proposing a range of harvest area sizes and 2) proposing harvest areas that are below the ILP guideline of 200ha for 17 of 19 harvest areas. It is important to note that depending on the interest of timber harvest permittees, an entire harvest area may or may not be harvested all at once or at all.

Harvest Area	Gross operable area (ha)	Net operable area (ha)	Above 200 ha threshold? (Y/N)
1	93.0	86.9	N
3	42.6	42.6	N
6	91.7	86.6	N
7	31.3	31.3	N
9	50.7	48.8	N
10	51.7	51.7	N
11	47.6	47.6	N
12	166.7	147.3	N
13	24.8	24.8	N
13b	39.5	39.2	N
14	165.7	139.0	N
15	98.8	98.8	N
16	244.4	225.4	Y
17	2007.1	194.1	N
18	159.8	146.8	N
19	68.1	62.0	N
21	188.0	176.5	N
22	271.5	255.7	Y
26	56.2	54.1	N
Total	2099.2	1959.2	2 of 19
Average size of harvest block: 103 ha Harvest blocks that are above 200 ha size threshold: 11%			

4.12 ILP Threshold: Amount of retention in harvest areas that are located within high wildlife value areas

Link to higher level plans

ILP guidelines for timber harvest project planning recommend that high wildlife areas (HWA's) average 25% retention of stand structure; the range of retention can be 10-30% stand structure depending on site characteristics. HWA's are a subset of the Forest Resource Management Zone (the "Green" Zone) that were established by the ILP landscape zoning process. Nearly 80% of the Green Zone is within a HWA. This indicator also reports on the SFMP objective to protect fish and wildlife populations and their habitats under Goal A which is to main the function and integrity of forest ecosystems.

Baseline status

Considerable research has been carried out on the merits of establishing retention areas as a 'fine filter' means for managing for biodiversity.

Change in status with THP development

The majority of harvest areas in the THP are situated completely or partly within HWA's. The ones that are not are areas 17, 18 and 22. In addition, all harvest areas are outside important corridors for wildlife movement as determined by the connectivity plan for the CATT (see Indicator 4.6). This table shows the total area of interest and the gross and net operable areas of all of the nineteen harvest areas in the THP including the three areas that are outside the HWA. Retention is calculated as the difference between the area of interest and the net operable area. All harvest areas in the THP include group retention areas (including wildlife buffers, riparian buffers, visual buffers), some of which lie adjacent to the external boundary of the harvest area. All harvest areas are within or above the stand-level 10-30% target for retention and the average retention across the THP is 34% which is above the 25% average target for retention.

Forest management considerations

The SFMP considers the protection of fish and wildlife populations and their habitats to be a critical to achieve to attain sustainable management of forest resources in this region. Ongoing monitoring is required to assess the effectiveness of the retention strategies outlined of the THP in mitigating impacts of harvesting activities on wildlife populations. Effectiveness may be reduced because of the adjacency of many reserves to the external boundary of the harvest areas. The ILP also places priority on fire

THP Harvest Area	Area of Interest (ha)	Gross Operable Area	Net Operable Area (ha)	Net Operable Area (%)	Percent of AOI Retained (%)
1	143.3	93.0	86.9	61	39
3	53.8	42.6	42.6	79	21
6	179.8	91.7	86.6	51	49
7	50.8	31.3	31.3	56	44
9	68.0	50.7	48.8	70	30
10	73.0	51.7	51.7	71	29
11	54.8	47.6	47.6	88	22
12	236.2	166.7	147.3	64	36
13	28.6	24.8	24.8	87	13
13B	60.7	39.5	39.2	62	37
14	210.5	165.7	139.0	68	32
15	148.8	98.8	98.8	65	35
16	298.9	244.4	225.4	75	25
17	240.8	207.1	194.1	81	19
18	277.0	159.8	146.8	53	47
19	121.4	68.1	62.0	53	47
21	256.1	188.0	176.5	68	32
22	362.0	271.5	255.7	71	29
26	89.7	56.2	54.1	54	46
Total area of interest: 2954.2 ha Total gross operable area: 2099.2 ha Total net operable area: 1959.2 ha Average net operable area: 66% Percentage of area of interest retained: 34%					

hazard reduction within the Canyon and Pine Lake landscape units; therefore, monitoring to assess the degree to which the THP has been successful in developing harvesting plans that integrate and manage for wildlife and a range of other values including fuels reduction also seems warranted.

4.13 ILP Indicator: Amount of area harvested in fuel abatement zones

Link to higher level plans

This indicator relates to SFMP Goal B: Community Sustainability and Benefits. The ILP suggests that management for harvest areas in the landscape fuel abatement zone occur as part of integrated resource management and fuel management strategies can be implemented in conjunction with activities already occurring on the landscape.

Landscape Unit	Landscape Fuel Abatement Zone		Interface Fuel Abatement Zone		Community Fuel Abatement Zone		Total (Past Harvesting and THP)
	Past Harvesting (1990 – 2007)	THP (Net Operable Area)	Past Harvesting (1990 – 2007)	THP (Net Operable Area)	Past Harvesting (1990 – 2007)	THP (Net Operable Area)	
Canyon	0	883	0	0	0	0	883
Pine Lake	114	1154	0	0	0	0	1268
Haines Road North	957	0	62	0	0	0	1081
Kloo Lake East	0	0	0	0	0	0	0
Game Sanctuary North	1	0	12	0	8	0	21
Entire CATT Planning Area	1164	2037	74	0	8	0	3201

Baseline status

There is a history of small scale harvesting for fuel abatement purposes in the CATT. Firesmart treatments have been carried out within or immediately adjacent to several of the communities in the region. In addition, Quill Creek was established as an interim wood supply area for fuel abatement reasons; however to date, little of this area has been harvested. A fire break was also created near the Nygren subdivision. Community fuel abatement plans are also in preparation for 5 communities in the CATT.

Change in status with THP development

Fuel abatement of spruce beetle-infested wood is identified as a priority forest management objective in the SFMP to reduce the risk to communities from wildfire. The ILP established fuel abatement zones and priority areas for fuel treatment. All of the areas proposed for harvesting in the THP fall within the Landscape Fuel Abatement Zone. While most of the proposed harvesting areas are not being harvested strictly for fuel abatement purposes, harvest areas 16 and 22 are considered higher priority areas to harvest for fuel abatement reasons due to their proximity to the community of Haines Junction.

Forest management considerations

Trees felled for fuel abatement purposes can provide a source of fuel wood to communities while providing preventative measures to minimize fire risk in populated areas. Due to the high cost of traditional fuel abatement techniques (e.g. FireSmart), it will be imperative to identify a cost-effective

way to carry out these treatments in order mitigate fire hazard at the scale that is being envisioned through the community fuel abatement planning process. Research to test the effectiveness of alternative fuel treatments in reducing the risk of crown fires developing in these stands is warranted. It would be useful to establish operational trials to be able to monitor the success of alternative treatments.

5.0 Conclusions and Recommendations

This report has demonstrated how indicators are a useful analytical tool to support Timber Harvest Project planning for the following reasons:

- 1) Indicators are a useful tool to communicate to the community how well the proposed project is doing at achieving community-directed goals and objectives of forest management. In this way, indicators are also a useful tool to support the environmental assessment process.
- 2) If integrated early into the THP planning process, indicators may be useful tool to guide project planning.

This report represents the first effort in the Yukon to incorporate indicators into the planning process. From this experience we have learned:

- 1) Goals and objectives of sustainable forest management in the CATT range from economic, environmental, social and cultural. However, because analysis in the report was limited to GIS data analysis, this report was only able to analyze a certain number of indicators. Due to the nature of the data that is available in GIS, the indicators analyzed in this report for the most part pertain only to environmental objectives. Additional work is required to collect the data that is needed to report on indicators that relate to social, economic and cultural objectives. However, despite this limitation, this report is a good example of how SFMP indicators may be incorporated into THP planning process.
- 2) This assessment is just a paper-based exercise. On the ground monitoring of forest activities is also required.