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Mr. Phil O'Connor, R.P.F.
Executive Director, Managed Forest Council
305- 1627 Fort Street, Victoria, BC V8R 1H8

RE: ASSESSMENT OF WATERSHED MANAGEMENT IN CH1, MF360 CHAPMAN CREEK

INTRODUCTION

At the request of the Managed Forest Council (Council) I conducted an assessment of recent logging practices carried in Block CH1 in MF 360 in the Chapman Creek Watershed. The logging was done by a contractor working on behalf of AJB Investments (a wholly owned subsidiary of Surespan Construction Ltd. of North Vancouver).

Council requested this assessment after it received a complaint from the Sunshine Coast Regional District (SCRD) regarding increased turbidity levels in Chapman Creek allegedly due to logging. The logging was being completed on Private Land.

The purpose of the assessment was to:

1. Complete an onsite review of harvesting within Block CH1 associated with Managed Forest # 360 and the claim by the Sunshine Coast Regional District that activities of the owner in harvesting this block have been “linked” to increased levels of turbidity in Chapman Creek.
2. Complete an onsite review of the road construction associated with the harvesting of Block CH1 and Managed Forest # 360 to industry standards and the “link” by the Sunshine Coast Regional District to increased turbidity in Chapman Creek.
3. Complete an onsite review of the drainage structures, sediment control measures and the maintenance of these drainage structures and control measures associated with the harvesting of Block CH1 and Managed Forest # 360 to industry standards and the “link” by the Sunshine Coast Regional District to increased turbidity in Chapman Creek.
4. A technical report that provides an assessment of the harvesting, road construction, drainage structures and sediment control measures to industry standards associated with the development of Block CH1 and Managed Forest # 360.

I visited the site on October 26, 2104 accompanied by Mr. Mark Rogers, Vice President, Surespan and Mr. Paul Tingley, R.F.T. of Tingtech Resources Ltd. The visit focused on Block CH1, in which logging for the year was being wrapped up, with about two-thirds of the area harvested.

BACKGROUND

The Block CH1 is located upslope and adjacent to the Sechelt Dakota Forest Service Road, which runs parallel and an estimated 120 to 150 m upslope from Chapman Creek, about 1 km upstream from the Licensed Water Intake for the Sunshine Coast Regional District (SCRD). This is important because any sediment entering streams that cross this FSR would likely be transported to the creek.

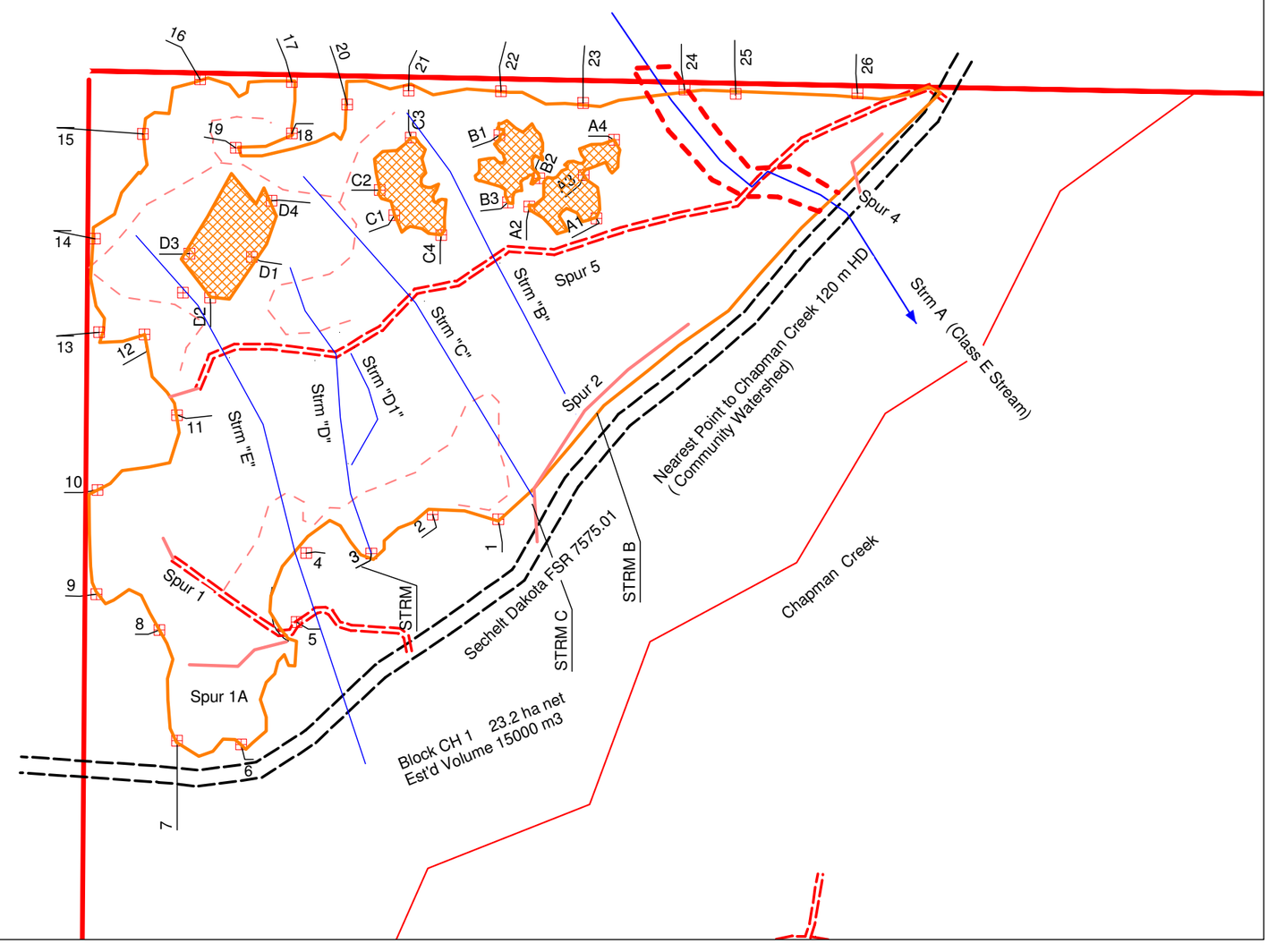
The Block is 23.2 ha and has been logged so far with ground-based harvesting techniques, namely hoe-forwarding and rubber-tyred skidder (Fig.1). The timber consists of second-growth Douglas-fir, hemlock and amabilis fir, with lesser redcedar. The entire area had been logged in the past, possibly 50 to 60 years ago.

TTRi TingTech Resources Inc

Surespan Construction Ltd
Harvest Plan Map
Block CH1 Draft Ver 3

Legend

FC's	NCD
Falling Boundary	Forest Service Road
Ground Based Harvest Area	Reach Break
Legal Line	New Road Construction
Skid Trail	Swamp
Non-Fish Stream	Landing
Existing Private Road	Roadside Crown Exclusion Ar
Natural Gas Line	Special Management Zone (S
Fish Stream	2014 Logging
Retention Patch	Logged 2013



Logging access was via two reconstructed roads, Spur 1 in the southwestern part of the harvest area and Spur 5 which climbs up from the FSR in the northeastern part of the area. Spur 2 climbs up from the FSR in the middle of the Block and runs parallel and upslope of the FSR.

The Block is on variable terrain, ranging from 10 to 70%. This created difficulties in steeper areas, where it was necessary for hoes to climb fairly steep slopes (40-50%) to reach areas where they could forward the wood. On steeper ground it was necessary to fall timber from steeper areas down onto gentler slopes that were machine accessible. Because of the locally steep terrain, the contractor developed bladed skid roads (not trails) off Spur 1 and 2 that required cut and fill construction.

In addition to the built roads there are a number of bladed trails used to allow access by tracked forwarders. I understand that the skid roads and bladed trails were not laid out prior to logging.

The FSR required reconstruction (mainly brushing) before CH1 was developed. The FSR beyond (northeast of) the Spur 5 junction remains partly brushed in, but with cross-drains installed. AJB did not clean ditches as the FSR was upgraded. At the time of my assessment, the last few loads of logs were being hauled out, but no deactivation had been done.

The two main roads (Spurs 1 and 5) that climb up from the FSR had been built in the 1990s and then rebuilt and/or upgraded by AJB this year. Some seasonal deactivation had been done on Spur 1 because logging had been completed, but no deactivation had been done on Spur 5 at the time of my assessment. This may have been planned but not completed.

OBSERVATIONS

Spur 1

Spur 1 is a conventional cut and fill logging road built with steep (15%) grades through deep glacial deposits, with deep and locally unstable cutslopes (Photo 1). The grades are such that it is difficult to avoid erosion and sedimentation from the running surfaces, cutslopes and ditches (Photo 2). The road grade becomes gentler after about 100 m. There is a culvert for Stream “E” which appears to be sufficiently large for the discharge, but unfortunately is too short for the road (or the road is too wide) so that there has been some erosion of the fillslope above the outlet (Photo 3). This introduced sediment was transported downstream.

The unstable cutslope, running surface and large ditch has resulted in obvious signs of sedimentation, with turbid water from the ditch emptying into an intake pond above the culvert under the FSR. This pond has intercepted a portion of the fine sands and silts, but

water flowing through the culvert is still turbid. However below the FSR this drainage follows an old logging trail for at least 600 m and eventually ponds in a wooded area above Chapman Creek.

I understand that heavy rains occurred in early October and at that time the road was in active use. As a result, the junction of the FSR and Spur 1 was covered in mud. In response, AJB directed the contractor to upgrade sediment control measures, including installation of additional hay bales and silt fences. These have had marginal effectiveness with most water flowing under the hay bales or around the silt fences.

Spur 5

Spur 5 is the longest spur road; again it was built in the 1990s and rebuilt this year by AJB.

Like Spur 1, this road climbs steeply off the FSR switch-backing up with grades of up to 27% (Photo 4). Ditch water is discharged down to the FSR then under the beginning of Spur 5 via a small plastic corrugated culvert and into the ditch alongside the FSR, ultimately to flow into a culvert and down to Chapman Creek. Unfortunately, this additional water from Spur 5 threatened to overload the ditch which would then flow onto the running surface of the FSR, potentially eroding it.

The steep grade of the road was also a source of sediment, especially during and immediately after active logging. The surface had experienced rill and sheet erosion. The steep pitches should be seasonally deactivated with water bars and/or cross-drains but at the time of my assessment logging had not been completed.

In several locations along Spur 5 the contractor had developed machine access roads (bladed roads not trails) off the spur road to access wood above the road (Photo 5). Since no culverts were installed where the roads left the spur road they blocked ditch flow, forcing it to flow onto the surface, which, after machine traffic, left ruts and an eroded surface.

The access roads themselves climbed up at very steep slopes (up to 45%); as there was no deactivation this led to substantial erosion, but not necessarily sediment delivery to any stream.

In several locations, logging slash blocked culvert intakes (admittedly logging had not been entirely finished). I noted ponding of water in grade dips, mainly from water flowing down the running surface on both sides of the dip and not necessarily from insufficient culvert capacity. However the running surface turned to mud after machine traffic generating splash sedimentation and creating an unfavourable image. In fact I suspect that very little of the mud produced was actually delivered to a stream.

I also noted that two of the machine access roads climbed above the Spur in swales subject to seasonal flow (Photo 6) and in at least one case up a small stream (not Class E). These locations were chosen because they were the best routes for access to gentler slopes above. However, the result is that when heavy rains occurred in October erosion developed creating an unsightly image (Photos 7 and 8).

Finally, I noted that one small stream had not been culverted with the result that water was flowing over the running surface in a slight grade dip. I should note that the watercourse in question would likely have been classed as a non-classified drainage (NCD) and would not have been obvious during dry season lay-out, nevertheless a culvert should have been installed once it became evident that a water problem was occurring.

Sechelt Dakota FSR

From the perspective of managing water quality, the Sechelt Dakota FSR is important due to its proximity to Chapman Creek. The FSR in the northern half of Block CH1 lies above a 55 to 75% slope that drops directly to the mainstem channel, only about 1 km above the LWI.

At the time of my assessment, despite recent heavy rain, the road prism itself was in good condition, with a crowned surface and no grader berms on the downslope side. There was evidence of cutslope slumping into the ditch, almost all of which occurred decades ago (Photo 9). I saw no evidence of recent instability.

Prior to logging, the decision was made not to clean the ditches along the FSR downslope of Block CH1. This decision was taken due to legitimate concerns that cleaning would result in increased sediment delivery to Chapman Creek. However, after heavy fall rains it was clear to me that the ditch was inadequate to convey the amount of water and in several locations there was a risk of overflow from the ditch onto the road running surface. After having seen this I would suggest cleaning the ditch next year under dry conditions.

No culverts were replaced but all existing (and old) pipe culverts were functioning satisfactorily. Modern industry standards would involve minimum 600 mm pipes rather than the 400 or 500 mm pipes in the original road. In at least one location the water flow through the existing pipe was near the maximum capacity. Stream “A” in the northern portion of the Block is the largest; the existing 900 mm pipe appears to be adequate to convey the flow.

Near Stream “B” the contractor expanded an existing turn-out, pushing earth towards the stream channel on the downside (right) of the road (Photo 10). This is an opportunity for direct delivery of sediment into the stream. This should be pulled back as soon as possible when the weather dries out.

Another factor affecting road drainage is the practice of decking logs in the ditch (Photo 11). This diverts water onto the road and softens it, leading to sedimentation after vehicle use.

CONCLUSIONS

Although there has been no clear contravention of the regulations it is clear to me that industry standards for protecting water quality have not been met in CH1. The short-comings are substantially more serious given the fact that this logging has been carried out in a highly sensitive watershed supplying a large population.

There are some extenuating circumstances in that the FSR and Spur 1 and 5 had been located and built well before planning for CH1 commenced and it was reasonable that these roads be rebuilt rather than new ones constructed.

There are a number of problems with roads and drainage structures that taken individually are not particularly serious and taken together, in a non-sensitive area, would not cause concern. The issue is that logging and road building were not conducted with the sensitivity required in the Chapman Creek watershed.

I believe there are two key failures:

1. Logging should have been curtailed before the onset of fall rains. Roads should have been seasonally deactivated after cessation of activities. A large part of the sediment problems arise from hauling down steep grades on wet roads, and failure to properly deactivate bladed skid roads prior to onset of heavy rains.
2. Inadequate supervision and/or instruction about how to operate in a sensitive watershed. Decking wood in ditches along a road directly upslope of Chapman Creek is just one indication that the message just didn't filter down to the logging contractors.

Yours sincerely,

This is a digitally signed duplicate of the official manually signed and sealed document.

Gordon Butt, M.Sc., P.Ag., P.Geo.Professional Geoscientist

PHOTOS

Photo 1. Intake pond at junction of FSR and Spur 1. The hay bales have marginal effectiveness since ditch water flows underneath them. The intake pond in the foreground is reasonably effective in settling out coarse sediment such as sand and possibly a part of the silt fraction.

Photo 2. Large unstable cuts in Spur 1. A significant sediment source, however this road was originally built in the 1990s and so it is in part a 'legacy' problem. It should have been seeded to an erosion control mixture shortly after reconstruction.

Photo 3. Spur 1 looking down-grade. The pipe is too short (or road too wide) and fillslope has eroded. Note water bar this side of the culvert that drains Stream 'E'.

Photo 4. Spur 5 climbs steeply above the FSR. The steep grade has been subject to sheet wash and rill erosion and the ditch water was diverted into the FSR ditch, possibly overloading it.

Photo 5. Spur 5 and machine access trail to left. No water management on the steep trail and no culvert allowing ditch water to drain.

Photo 6. Machine trail up a swale from Spur 5. It has no diverted surface flow. It was probably dry at the time of logging, but trails should not be placed on watercourses.

Photo 7. Spur 5. Water ponded in ditch between two machine access trail. These trails should be put to bed immediately after use.

Photo 8. Rill erosion down machine access trail, off Spur 5.

Photo 9. FSR. The road is well crowned with no grader berm, but the old ditch is ineffective due to soil slumping in over the decades. Given the amount of rain, the ditch should have been cleaned in the dry season and pipes replaced as needed.

Photo 10. Existing turn-out on FSR was expanded by pushing earth out. Stream channel is immediate to right and flows directly to Chapman Creek.

Photo 11. Logs decked in ditch. This impairs the function of the drainage system ona road directly upslope of the Chapman Creek mainstem. This should not happen in a sensitive watershed providing drinking water.