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OEL File: 2024-1

July 9, 2020

Graestone Ready Mix Ltd
David Rogalsky, Manager
PO Box 226
Aldergrove BC
V4W 2T8

RE: Chehalis FSR Assessment – 0 - 11.5 km

As requested by Mr. David Rogalsky of Graestone Ready Mix Ltd. (GRM), Onsite Engineering Ltd. (OEL) has completed a field review of the Chehalis FSR from its junction with the Morris Valley Road to approximately 11.5 km and the road junction at an existing gravel pit. This report was prepared to provide GRM with a summary of the field review completed on June 2, 2020. Michael Foster, P.Eng representing OEL completed the field assessment. The road was accessed via 4x4 vehicle, and weather conditions were overcast and cool.

The Chehalis FSR is a gravel surfaced resource road within the Chilliwack Natural Resource District under management by the Ministry of Forests, Lands, Natural Resource Operations and Rural Development. Western Canadian Timber Products is the current designated road user for maintenance.

The purpose of the assessment was to review the existing road and make recommendations such as:

- Increase sight lines for traffic with potential road widenings or pullouts
- Review the road surfacing and make recommendations on upgrades
- Review existing drainage structures
- Review bridges for load rating upgrades or widening due to tracking concerns.

1 Chehalis FSR Assessment

1.1 Access Route Description and Upgrade Considerations

Overall the Chehalis FSR is currently in good condition and is in active use, with both industrial traffic and private vehicles noted on the road system. Figure 1 on the following page shows the approximate km markers along the road which will correspond to the road stations in Table 1.

Existing road grades easily navigated by logging trucks and gravel trucks with a maximum road grade of 12% encountered along the road section.

Numerous existing pullouts exist along the route however, many may be undersized to accommodate a dump truck with trailer. Existing empty logging truck traffic typically drives up the FSR with the trailers loaded onto the back of the tractor which results in a shorter overall vehicle length. As the typical road width doesn't quite meet the MOF requirement for a 2 lane road (8.0 m) the road is considered single lane but many sections could easily be widened to meet an 8.0 m road width once brushed. The road section from 2.5 – 4.2 km should be considered single lane with no potential to fully widen to double lane.

Recent road maintenance for some items seems to be lacking with vegetation overhanging into the roadways which blocks sightlines. Additionally, vegetation in ditches has overgrown and is now

impeding surface drainage. Extensive work to brush out the right-of-way and fall some larger deciduous trees should be considered as a high priority for increased hauling. Ditch cleaning will help maintain the road surface during periods of rain by removing surface water and keeping the road subgrade drained.

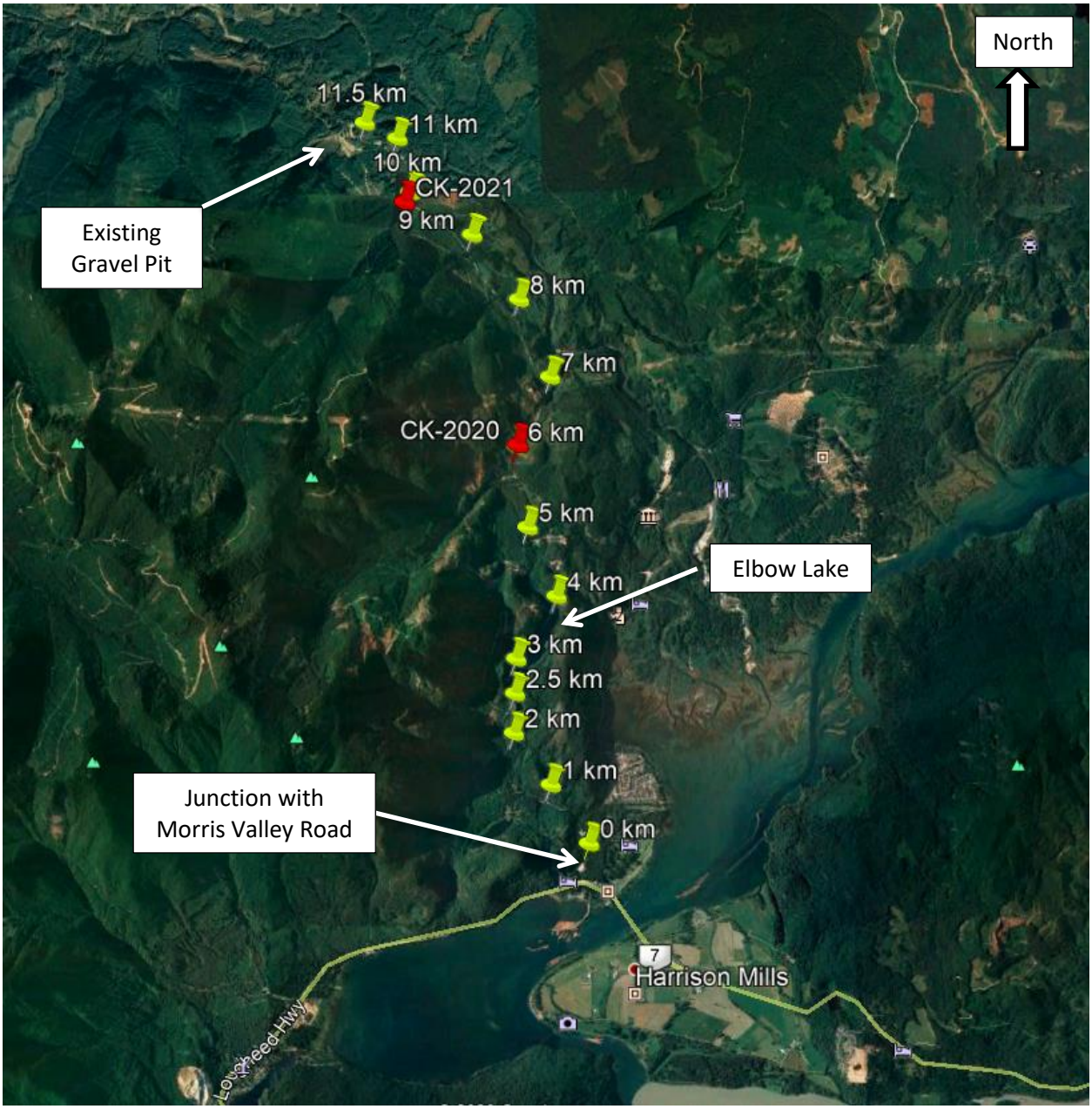

Figure 1. Project Overview Map

Table 1. Road Assessment Summary and Recommended Work

Road Station	Current Conditions	Recommended Work
0 km	Existing junction with Morris Valley Road, start of full two lane road	Recommend to install 60 km/hr speed limit sign (typical FSR speed limit)
0.6 km	Road narrows to a single lane road due to bedrock on uphill side and stream on downhill side, large existing pullout on the town side available	Brush out sight lines and clean ditches
0.8 km	Existing pullout available	Brush out sight lines and clean ditches
1.1 km	Existing pullout available, road is over 10m wide	Brush out sight lines and clean ditches
1.5 km	Road surface has excessive washboard due to rough surface over a 150 m long section	Consider widening out the corner to improve sightlines. Place and compact 1' lift of 3" minus CBC and a 6" thick layer of HFSA to improve road surfacing and grade.
1.8 km	10m wide road	Brush out sight lines and clean ditches
2.1 km	Existing pullout but likely too short for dump truck and trailer	Brush out sight lines as road is 2 lanes wide and clean ditches
2.4 km	10m wide road on approach to campsite	Consider posting reduced speed limit sign (30 km/hr) through Elbow Lake road section due to heavy public use of the lake and pullouts along the lake. Post 60 km/hr sign for traffic heading down.
2.8 km	Existing pullout but likely to have public vehicles parked during summer months	Brush out sight lines, road is generally single lane, and clean ditches
2.9 km	Existing pullout but likely to have public vehicles parked during summer months	Brush out sight lines, road is generally single lane, and clean ditches
3.2 km	Existing road is 11-12 m wide	Brush out sight lines and clean ditches
3.4 km to 3.9 km	Existing road is 6-7 m wide, rock bluffs above	Brush out sight lines, road is generally considered single lane, existing pullouts available but likely to have public vehicles parked during summer months, and clean ditches

Road Station	Current Conditions	Recommended Work
4.2 km	End of narrow road section	Post 60 km/hr sign for traffic heading up, 30 km/hr chain for traffic heading down
4.5 to 6 km	7-8 m wide road, not quite full two lane road width with no existing pullouts except at road junctions at 4.9, 5, 5.7, and 5.9 km. 5 km is the junction to a Correctional Service Canada facility.	Will need to review junctions for length of truck and pup to determine if they can work. Brush out sight lines and clean ditches.
5.8 km	Existing bridge CK-2020, currently load rated to L-165 or 150 tonnes. Structure has no vehicle tracking concerns.	Abutments are old log cribs with untreated timbers, MOF will likely require this entire structure to be replaced within 2 years with a longer bridge
6 to 7 km	Typically 7-8 m road width with a 12 m wide road width at 6.9 km	Brush out sight lines and clean ditches
7.4 km	Narrow road section for 100 m length in a thru cut.	Long term road use with increased traffic would require widening this road section,
7.9 km	Existing pullout available	Brush out sight lines and clean ditches
8 to 10 km	Road is typically 7 to 8 m wide with pullouts at 8.4, 8.6, 8.8, 9.0, and 9.8 km.	Brush out sight lines and clean ditches
10.1 km	Existing lock block retaining wall along uphill road edge to capture raveling material.	Brush out sight lines and clean ditches
10.2 km	Existing bridge CK-2021, currently load rated to L-150 to 136 tonnes. Structure is in a tight corner but current logging truck traffic can track adequately.	Brush out sight lines, ensure bridge ahead signs are posted on each approach, and clean ditches. Due to the tight curves on approach to the bridge and limited sight lines this road section should be posted to 30 km/hr.
10.5, 10.7, 10.9 km	Existing undersized pullouts	Minor construction work to widen pullout for dump truck and trailer. Brush out sight lines and clean ditches.
11.4 km	Extremely large pullout area in old gravel pit area	N/A

Road Station	Current Conditions	Recommended Work
11.45 km	Old wood stave culvert	Still functional but consideration should be given to replacing with corrugated steel pipe
11.5 km	Existing junction to gravel pit. Junction is gated.	Post road junction warning sign on woods approach on Chehalis FSR to notify users in the change in road activity from the gravel pit. Ensure an R-1 stop sign is posted on the gravel pit road on approach to the FSR.

1.2 Hauling Considerations

While the existing FSR would generally be considered safe from a road use perspective, there are a number of items that would need to be addressed in a hauling safety plan or Standard Operating Procedure (SOP).

- Ensure all vehicles are equipped with a VHF radio with the resource road frequencies
    - It is important to note that resource roads are "radio assist". Always drive to the road and weather conditions, drive defensively, expect the unexpected, and do not solely rely on mobile radio communications recognizing that not all road users have a mobile radio (ie public users).
    - Defensive driving remains the most important tool to address industrial road user safety.
- Always drive with your lights on
- Work with the main road user to ensure road km signs are permanently installed (not just painted on trees/rocks)
- Work with the main road user to agree on road calling procedures and ensure all truck drivers are given instruction on the procedures.
- Consider field numbering pullout locations with their km location (ie Pullout 3 at 1.1 km)
- With the high public use of Elbow Lake and adjacent campground, consideration should be given to assuming that the existing pullouts between 2.4 and 4.2 km are in use by public vehicles and would not be available for industrial vehicles.
- The Elbow Lake road section would be the restriction on determining the number of vehicle per hour the road could sustain. Assuming the design speed of 30 km/hr for this road section is adhered to, it would take on average 3.4 minutes for a vehicle to travel this section of road. This would equate to 17.6 vehicles per hour assuming back and forth traffic or 8.8 loads per hour for all industrial vehicles.

2 Conclusions and Recommendations

The Chehalis FSR is considered safe for industrial use but typical road maintenance work has been lacking in the last few years. It is recommended that at a minimum the following maintenance work and haul planning be completed:

- Brush the road R/W to remove all overhanging vegetation along the road sides
- Prior to the fall of 2020 complete ditch cleaning activities. Note that this item may be able to be completed to some degree through road grading once the road sides are brushed out.

- Install additional signage on the roads as noted throughout Table 1 including speed limit signs.
- Determine which existing pullouts are long enough for the hauling equipment planned for use and which pullouts require lengthening.
- Create a hauling safety plan or SOP

This project has been carried out in accordance with generally accepted engineering and geoscientific practice for the area. Conclusions and recommendations presented herein are based on visual site inspections of the selected access roads and structures.

Factual data and interpretation contained within this report were prepared specifically for Graestone Ready Mix Ltd with whom Onsite Engineering Ltd. has entered into a contract. We trust that this report satisfies your present requirements. Should you have any questions or comments, please contact our office at your convenience.

Sincerely,
Onsite Engineering Ltd.

DRAFT FOR REVIEW

Michael Foster, P.Eng., RPF
Senior Engineer

Attach.

- Photo Sheets
- Best Management Practices for mobile 2-way radio use on resource roads in BC, installation and maintenance

	**Photo 1** Junction with Morris Valley Road at 4-Way Stop Sign
	**Photo 2** Narrow road section at 0.6 km.

	**Photo 3** 0.8 km Chehalis FSR, typical pullout
	**Photo 4** 1.5 km Chehalis FSR, road section with washboard surface

	**Photo 5** 1.5 km Chehalis FSR, road section with washboard surface
	**Photo 6** 2.4 km Chehalis FSR, view towards campsite

	**Photo 7** ~3.4 km Chehalis FSR, narrow road section with rock bluffs above
	**Photo 8** ~3.9 km Chehalis FSR, narrow road section with talus rock slope above

	**Photo 9** 4.4 km Chehalis FSR, typical 7-8 m road width
	**Photo 10** 5.8 km Chehalis FSR, wide road with existing pullouts / junctions

	**Photo 11** 6.9 km Chehalis FSR, ~15 m wide road for 50 m length
	Photo 12 7.4 km Chehalis FSR, narrow road section in thru cut

Photo 13
8.6 km Chehalis FSR, typical pullout

	**Photo 14** 10.1 km Chehalis FSR, rock fall catchment retaining wall
	**Photo 15** 10.6 km Chehalis FSR Existing area that could be widened to create new pullout. Also available at 10.4 and 10.9 km

	**Photo 16** 11.3 km Chehalis FSR Existing area that could be widened to create new pullout. Also available at 10.4 and 10.9 km
	Photo 17 11.5 km Chehalis FSR, view up towards existing gate

Photo 18
11.5 km Chehalis FSR, view from existing gate towards FSR