Forest Resources Act
Standards and Guidelines
Forest Resources Roads

Yukon
Energy, Mines and Resources
Forest Management

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Forest Resources Road Standards and Guidelines, as well as other Forest Management Branch (FMB) publications, are available from:

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Also many FMB publications may be downloaded free of charge at **http://www.forestry.gov.yk.ca/**

Photos: Yukon Government

Contents

1. About Standards and Guidelines

This document is a combination of standards and guidelines. Standards are indicated where a "must or shall" statement is made; all else is supporting information. On each page standards are indicated by highlighted text.

Forest Resources Act standards together with authorizations (cutting permits) and site plans ensure that forest resources road (FRR) activities are conducted safely and in a manner that protects environmental resources.

This document outlines several types of roads that may be constructed and provides proponents options for their specific project. Proponents provide road and project details in a site plan. Once in an approved site plan the details become enforceable as part of a cutting permit.

2. Overview

The *Forest Resources Act* (FRA) requires the Government of Yukon to develop standards for the construction, maintenance, modification and decommissioning of forest resources roads. The following information will assist operators in planning activities that can be approved in a site plan and authorized under the FRA. Key components:

- **Forest Resources Roads (FRR)** are not public roads and there is a permit required for use, construction, modification or decommissioning.
- **Planning**: Site Plans and Timber Harvest Plans (THP) are required prior to harvesting.
- **Monitoring and Inspections**: Impacts of activities on FRR will be monitored and inspected for compliance.
- **Permitting and Enforcement**: Failure to comply with permit conditions, standards, and plan requirements may result in enforcement action or termination of tenure.
- **Due Diligence**: Due diligence is one type of defence in case of an alleged contravention.
- **Engineering Assessment**: High risk roads (e.g. areas of high landslide potential, slopes >45%, major bridges and culverts) will require advice from a professional engineer or a geometric road design.

Due Diligence

As part of due diligence it is your responsibility to ensure that you know, understand and fulfill your legal obligations. It is recommended that engineering advice be sought early during a project. Where high risk activities are proposed an engineering assessment or geometric road design is required.

Activities on FRR must be conducted in a safe manner in accordance with the *Forest Resources Act* and the *Yukon Occupational Health and Safety Act*. It is incumbent upon all FRR users to ensure hazards are identified and reported as soon as possible and measures are taken to prevent incidents from occurring.

If in doubt about any work practices, procedures or legal requirements, contact your employer, industry association, or the appropriate agencies listed on page 29.

OH&SA

The Yukon *Occupational Health and Safety Act* applies to forestry activities, including road construction and maintenance. Review of applicable regulations is required.

YESAA

A *Yukon Environmental and Socio-economic Assessment Act* (YESAA) screening is required for any roads that propose activities captured under the Assessable Activities Regulation (AAR); including leveling, grading, moving of earth or clearing land with equipment, and installation of culverts or bridges. For more information see the AAR or contact a local YESAB Designated Office: www.yesab.ca.

Other Authorizations

For a FRR which connects to a public highway:

- Apply to the Department of Highways and Public Works for a “Works Within the Right of Way” Permit and
- A Land Use Permit from the Land Management Branch

3. Soil Conservation

Government Standards & Guidelines for Soils

Activities on FRR do not fall under the category of in-block soil disturbance, however, some components of soil conservation may still be applicable, such as:

- Protect soil properties.
- Minimize the amount of temporary and permanent FRR and landings.
- Minimize erosion, compaction and disturbance to soils.
- Avoid permafrost areas where possible.
- Avoid operating on slopes greater than 30% with ground based harvest equipment.
- Soils with high hazard ratings will be scheduled for winter/frozen harvest unless the site plan states otherwise.
- Road management on high hazard soils requires additional ballasting materials for all season access.

Organic Soils and Substrates

Standards:

- Use suitable materials free of organic, clay or contaminated soil for road construction.
- During construction push aside organic matter, outside of the road prism, and retain as roll back materials.
- Do not use roll back material as substrate.

- Avoid areas that are too wet for road construction, but

  Where unavoidable, do not disturb the wet soil surface and utilize stabilizing materials such as corduroy or geotextiles.
- Use the Soil Conservation Standards and Guidelines to determine soil compaction, erosion and displacement.
- Record the maximum amount of permanent and temporary soil disturbance accepted within the harvest area, the default amount where not otherwise prescribed is 5%.

For further information, see the "**FRA Soil Conservation Standards and Guidelines**" or the "**BC Forest Road Engineering Guidebook**".

4. Riparian Areas

Government Standards & Guidelines for Riparian Areas

Riparian Areas Standards and Guidelines apply to activities on FRR except at designated crossings, where a riparian area must be breached. The following summary will assist with integrating road activities with riparian standards.

- Conserve the integrity of wetlands, water quality for fish, riparian wildlife values and hydrology.
- Manage any adverse effect of deleterious material.
- Minimize the number of stream and wetland crossings.
- Avoid shallow open water and marsh wetland riparian management areas except when no alternative exists.

Riparian management areas may be wider than required due to important lakes or rivers as identified in **higher level plans**.

Standards:

Water bodies are considered fish bearing unless proven otherwise by a qualified biologist.

Do not:

- Harm fish or adversely affect fish passage.
- Destroy, damage, or harmfully alter fish habitat.
- Store fuel or park equipment in riparian management areas.
- Operate in the Reserve Zone except for designated stream crossings.

Do:

- Maintain natural water flow of the wetland under the road.
- Use drainage culverts in case flow is restricted by road construction.
- Locate waste areas, borrow pits and quarries outside of riparian management areas.
- Locate crossings perpendicular to the riparian feature.

The Federal *Fisheries Act*

Submit a proposal for review by Fisheries and Oceans Canada (DFO) when your project has the potential to impact waterbodies that support fish or a fishery.

For further information, see the Fisheries and Oceans web site on "**Projects Near Water**" and "**self-assessment**". Review the DFO section on "**measures to avoid causing harm to fish and fish habitat**" for mitigations which will assist in complying with the *Fisheries Act*.

5. Site Plans

A site plan:

- Is required prior to obtaining a cutting permit, or Forest Resources Road (FRR) permit
- Must be consistent with higher level plans and be submitted to the Forest Management branch (FMB) for approval
- Becomes an integral component of the cutting permit and obligations become enforceable once the permit is issued

When planning:

- Minimize the number, class, width and length of roads.
- Consider future uses of the road system.
- Use existing roads when they provide the best long-term access.
- Reconstruct or modify existing roads as necessary to provide adequate drainage and ensure safety.
- Locate roads on well-drained soils.

Standards:

- Do not disturb stable road surfaces.
- Slopes greater than 35% will require additional mitigation in the site plan to address possible terrain stability, erosion and safety hazards.

Example Site Plan FRR Specifications

ROAD DIMENSIONS	**Class:** Haul **Length:** 8.4 km	**Season of Use:** Winter **R/W Width:** 20m
Favorable Grade: max sustained favourable grade **10**%		Maximum allowable grade in pitches not longer than **30**m is **15**%
Adverse Grade: max sustained adverse grade **8**%		Maximum allowable grade in pitches not longer than **20**m is **12**%
Switchbacks grade not to exceed **6**%		**Intervisible Turnouts**: not less than **2** turnout(s) per km. Usable length not less than max. length of vehicle.
Design speed: **40** km/h		
Restoration of natural drainage: **recontouring**		Access control measures: **gates** Planned Revegetation: **reforestation**
Type of Bridge: n/a _____ **Bridges to carry: n/a _____ tonnes safely (double maximum loads)**		Cross drains to be placed not more than **200**m apart on grades over **5**%, otherwise **300**m apart

Proponents would fill out a table similar to this example, providing their chosen FRR specifications in a site plan.

6. Forest Resources Road Classification

FRR Classification Table						
ROAD CLASS	Road Type	Duration	Subgrade/ Running Surface (m)	Road Prism (m)	Clearing Width (m)	Permitted Right of Way (m)
1	Primary Roads (Mainlines)	Long term >10 years	10	20	26	35
2	Secondary Roads (Branch)	Medium term <10 years	8	14	20	30
3	Haul Roads (Spur)	Short term 1-3 years	6	10	16	25
4	Light Haul Roads (Spur)	Short term 1-3 years	4	7	12	15

FRR Classification Table					
ROAD CLASS	Description	Minimum Sight Distance (m)	Max Favorable Grade (%)	Max Adverse Grade (%)	Speed Limit km/h
1	General access in a forest planning area	85	11	6	60
2	Access to and within operating areas	44	15	8	40
3	Access to and within harvest blocks	30	18 /15 winter	10 / 8 winter	30
4	Not suitable for large logging trucks	30	30 / 20 winter	15	30

The FRR Classification table represents ideal values to result in a safe and stable road. Alternatives to the classification table:

- May be proposed in a site plan
- Will be matched against the identified standards and the objectives stated in higher level plans

Standards:

- On-site gravel sources must come off the existing road right of way, otherwise additional authorizations are required.
- In winter soil is not mixed with snow in the riparian management areas.

A winter FRR requires modified standards due to slippery surfaces, has a lower environmental impact, and is constructed after freeze-up.

6. Forest Resources Road Classification

Standards:

Primary roads:

- Are built to a geotechnical design standard that requires engineering advice
- Are subject to a YESAA screening (and other authorizations)
- Require additional surfacing material, ditching, and erosion prevention measures to mitigate the effects of spring thaw and fall freeze up

Secondary Roads:

- Are between primary and haul roads and suitable as the main access route
- Are constructed to a high standard to accommodate more traffic and a longer life span than haul roads

Haul roads:

- Are constructed with gravel as required to provide a suitable running surface
- Are low impact

Light Haul Roads are:

- For light trucks; pickups, five tonnes, and single axle trailers but, not large vehicles with multiple axles such as b-train trucks

Seasonal break up:

- Requires access control measures to protect the running surface and road prism, and ensure safety
- Restricts forestry operations, including road access

The exception for break up is where a primary road has been designed and constructed for true all-season access.

Sufficient inspections and maintenance are required to ensure protection of environmental values and safety during all seasons of use and for all classifications.

7. Skid Trails, Landings & Turnouts

Skid Trails

FRR standards and guidelines do not apply to skid trails.

Skid Trails are:

- Not Forest Resources Roads (FRR)
- Temporary in-block routes used to navigate through the harvest area and move the logs from stump to landing

Landings

Landings contribute to total soil disturbance as stated in the Soils Conservation Standards.

Provide landing details in the site plan regarding size, location and amount of total soil disturbance.

Landings should be:

- Located and sized as to reduce the overall adverse effects of the operation
- No larger than necessary for the safe operation of the equipment and decking of logs

Standards:

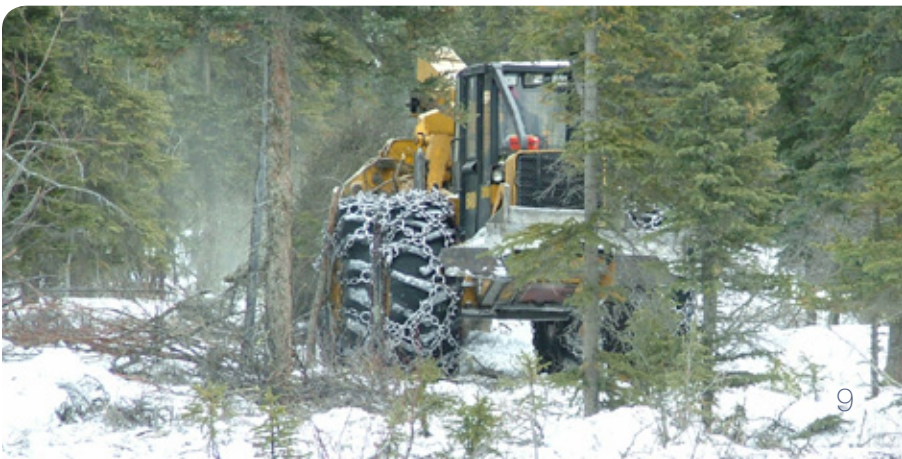
Landings must be:

- Located, constructed, and operated in a manner that avoids impacts to riparian areas, prevents debris from entering riparian features, prevents ponding and minimizes the risk of sedimentation
- Sloped, water barred, ditched or otherwise constructed and maintained to minimize accumulation of water on the landing

Excavated material must not be placed where it is likely to result in degradation of surface water quality.

Turnouts (Pullouts):

- Are required along single lane roads to allow for safe passage of oncoming vehicles
- Have at least two intervisible (visible from both directions) turnouts per km on single-lane two-way roads
- Usable length is not to be less than the maximum length of vehicles using the FRR
- Total road width of turnout to be three times travel portion (running surface) of FRR



8. Clearing & Grading

Clearing width is:
The minimum area cleared of trees.

Subgrade width is:
The total running surface of the road including surfacing or ballasting material (gravels, corduroy).

Clearing

- Harvest the minimum number of trees required to build the road and keep it safe.
- Pile timber neatly within the right of way for salvage.
- Remove stumps and organic matter for surface preparation where required.
- Increase width for turnouts, sight distance, snow removal and slash disposal.

Standards

- Remove all dangerous trees outside the clearing width but deemed hazardous to road workers.
- Obtain a geometric design for deep gullies, high ridges, slopes > 45%, or a high likelihood of landslides.

Grade

Standards:

Use the FRR Classification Table (page 5) to determine appropriate and maximum grades.

However; ideal grades should not exceed 10% and optimum adverse grades should be less than 5%.

A slight increase in grade is ok for short distances (<5km), with a straight run at the bottom and only on favourable slopes (not for adverse grades – hauling loads uphill).

Do:

- Limit grade length to minimize road and ditch erosion and gullying.
- Break the grade using drainage structures.
- Gravel the road surface on steep grades.
- Use side slopes, cut slopes and ditches to add stability.

Do Not:

- Build on or with very fine-grained soils of lacustrine origin and clay for sidehill construction.

For additional information **"BC Road Engineering Guidebook; Appendix 5: Tables to Establish Clearing Width."**

9. Surfacing & Stabilizing

After clearing trees:

- Grub/strip the right of way of any organic or top soil.
- Stockpile grubbed material at the edge of the right of way (ROW) (on the downslope side of the subgrade width).
- Use it later for revegetation or decommissioning.
- Dispose of slash and debris by burning, burying, scattering, or end-hauling (identified in site plan).

Disposal sites must:

- Be able to support debris without affecting slope stability
- Have low potential for failing into a stream (such as by landslide or snowslide)

Standards:

- Stumps, roots and slash must be placed outside the subgrade on the downhill side.
- Do NOT place slash or debris within a riparian zone.

Corduroy

- Is not suitable for primary roads
- Decommissioning is required within 5 years of construction with possible extension to 10 years with regular inspections.

Corduroy

- Is not ideal for secondary roads
- Distributes vehicle loads over the weak soils
- Reduces the amount of site disturbance
- Separates & supports the road fill from the underlying soil
- Should be completely buried to slow decomposition
- Will decompose over time and begin to settle

Ballasting

Rock as the subgrade will:

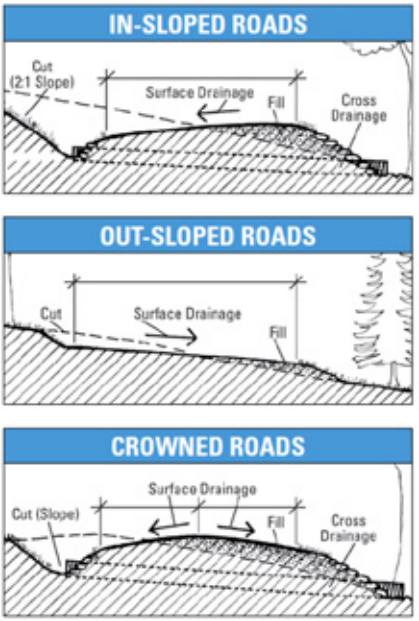
- Drain and compact well, form a structurally competent fill, and resist erosion

Gravel or crushed rock will:

- Result in a driveable surface, reduced erosion and assist the subgrade in supporting traffic

Geotextile fabric and Geogrids will further strengthen the road especially in weak soil areas.

10. Drainage



In-sloped roads

For single lane / steep grades (> 8%) / active FRR

Out-sloped roads

For single lane / flat or gentle grades (<8%) /seasonal and closed FRR / light traffic / where ditches or cut-slopes will be unstable and likely to erode.

- Surface should be kept smooth and rutting controlled.
- Vehicles can slide off in slippery or icy conditions.

Crowned roads

For single and two lane FRR / flat or gentle road grades / steep road grades if a single lane.

Get water off and away from the road

- Ditches and drainage structures are needed to carry surface drainage away from the road.
- Winter only FRR over flat ground do not need to be crowned or sloped.
- Regular maintenance of ditches, crown and drainage structures is needed.

Standards:

- Slope side cuts cannot exceed the natural angle of repose.
- Out-sloped is not suitable for winter roads.

11. Erosion Control

Standards:

Water Diversion Structures

- Divert water out of the ditches and disperse into the adjacent forest.
- Install temporary structures, (cross-ditches and open-topped culverts) where water is encountered to accommodate peak flows.
- Install sufficient cross-drains and ditch blocks to keep water from eroding the ditchline.
- Maintain buffers along riparian features in accordance with standards & guidelines (except at designated crossings).
- Obtain appropriate approval (DFO, water licence) for in-stream work.

Erosion and Sediment Control

- Operate in dry weather and select equipment that creates the least disturbance.
- Reduce the exposure of disturbed soil to flowing water during stream-crossing construction.
- Use temporary diversion or impoundment of stream flow to reduce the exposure of disturbed soil to flowing water.

Erosion Control

- Install silt fencing or erosion control revegetation mats.
- Place rip rap to reduce water velocity and scour potential.
- Install sediment catchment basins.
- Apply grass seed following completion of construction in areas of high erosion potential as per the Yukon Revegetation Manual.

12. Working Around Water

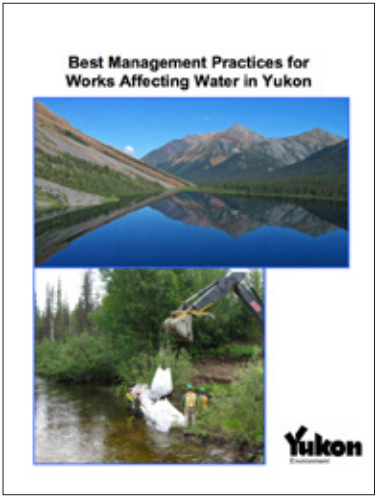
Standards:

A water licence is NOT required for:

Construction of a structure across a watercourse less than 5m wide (at ordinary high water mark).

Watercourse training (changing the flow or direction) of:

- Intermittent watercourses
- Watercourses that are less than 5m wide
- Removal or placement of less than 100m^3 of material & watercourse not significantly changed



See Environment Yukon's "**Best Management Practices for Works Affecting Water in Yukon**" for information on:

- Erosion and Sediment Control
- Contaminant Control
- Runoff Control on Roads
- Stream Fordings
- Clear-Span Bridges
- Culverts
- Ice Bridges and Snow fills

13. Culverts

Standards:

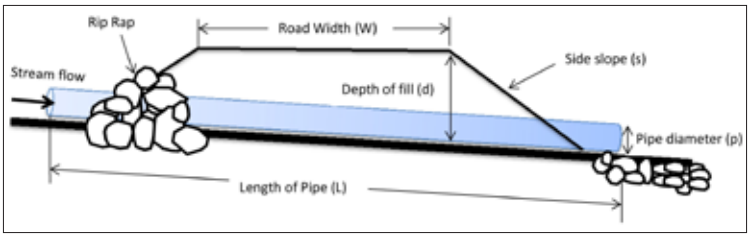
Culverts

- Position culverts on the line and grade of the original stream channel.
- Install stream crossing structures at right angles to the stream.
- Use a minimum culvert size of 500mm diameter.
- Ensure minimum roadside ditch depth is 1.5 times the culvert diameter.
- Cover the top of culverts with fill to a depth of at least one third culvert diameter or at least 300mm.
- Maintain a 30m no grub zone on either side of the creek except for the road bed.

- Arm inlets and outlets with rip rap where required; sized and placed to remain stable during peak flows.

Road Width (W)	Depth of Fill (d) 0.5	1.0	1.5	2.0
5.5	7.5	11.5	15.5	19.5
6.0	8.0	12.0	16.0	20.0
8.0	10.0	14.0	18.0	22.0
8.5	10.5	14.5	18.5	22.5
9.5	11.5	15.5	19.5	23.5
10.5	12.5	16.5	20.5	24.5

Length of pipe required (m)



Formula for Culvert Length

L = W + s (2d-p)

Length of culvert: L
Road width: W
Depth of fill: d
Culvert diameter: p
Side slope: s

50' All Steel Portable Bridge (16' wide)

14. Bridges & Temporary Crossings

Bridges

Standards:

A professional engineer must:

- Assume responsibility for design of bridge structures larger than 5m in length
- Take design responsibility for major culverts (>2,000mm diameter or a design discharge of 6m3/sec or greater)

A professional engineer is not required where:

- Operators can show minimal risk to environmental impacts on small, non-fish bearing streams
- Operators can show the bridge is safe and adequate for the crossing and design load (e.g. 80, 100 or 120 tonnes)

For more information view the "**BC Engineering Manual**" or the "**BC Fish Stream Crossing Guidebook**".

Standards:

Temporary Crossings:

- Are constructed in small, non-fish bearing streams only
- Must be anchored at one end with a cable so they do not float away during high water
- Must be installed for easy removal, regardless of season
- Pole fords must be removed immediately after use.

Timber mats:

- Span the width of smaller streams
- Are easy to install with a skidder or forwarder
- Can be used in any season

Pole fords:

- Are small logs placed side by side on the streambed
- Can impede stream flow if any debris becomes clogged on the upstream end

Frozen fords:

- Are used in small streams when ice is thick enough or the streambed is frozen enough to protect the streambed

15. Permafrost & Ice Crossings

Permafrost is:

Areas of semi-frozen taiga sensitive to any impacts including low ground pressure vehicles.

- Avoid areas of permafrost where practicable.
- Select routes that are upslope or on ridges where bedrock is closer to the surface.
- Select frost-free, south-facing slopes in areas of discontinuous permafrost.
- Use a low-impact vehicle or ATV rather than moving heavy equipment back and forth to access work sites.
- Avoid big cuts in the permafrost areas.
- Operate in winter for road construction in permafrost areas.
- Plan for minimizing impact and how to fix or reclaim the trail.

  e.g. cover tracks with mosses to ensure that the ground re-freezes and does not accumulate water.

Ice Crossings:

Ice crossings that are not constructed properly can cause freezing at the bottom if the flow of water becomes obstructed.

The resulting dam could create an icing that would spread beyond the stream banks, damaging both vegetation and the road.

Overwintering fish and aquatic mammals might also be negatively affected.

Standards:

Yukon FRR construction will follow the Northwest Territories Department of Transportation guide on ice crossings "A Field Guide to Ice Construction Safety, 2007."

Follow the NWT Guide For:

- Construction and maintenance of winter roads, ice road and ice bridges
- Safe work practices for those working on and around ice crossings.

Ice bridges:

- Must not obstruct the flow of water in a stream by causing it to freeze to the bottom
- Must be constructed to be safe and stable

For more information see **"Northern Land Use – Roads and Trails"** produced by the Government of Canada, January 2010 and **"NWT Field Guide to Ice Construction Safety, 2007."**

16. Log Fills & Log Culverts

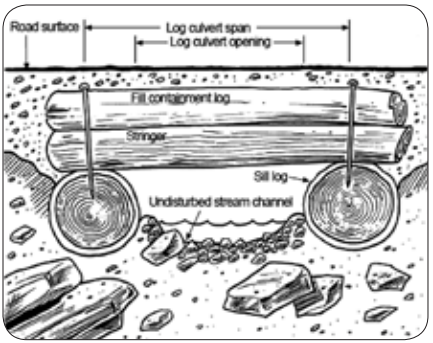
Log Fills

Standards:

- Log fills are not used on fish bearing streams.
- Must be removed when no longer required or prior to seasonal break up

- Ensure logs make up 80% of the total structure height.
- Use logs, not soil, to build up the crossing to the same height as the banks.
- Use delimbed and topped logs to avoid deposition of slash in watercourse channels, remove slash that is deposited.
- Put clean snow into the channel prior to the placement of logs to avoid freezing the logs down in winter.
- Ensure the log fill is 1.5 times the width of the road surface.
- Use a separation layer to cover the entire log fill.
- Use enough logs to avoid damaging channel or banks.
- Install brow logs and bump logs except when crossing dry ephemeral gullies.
- Target a dirt cap depth of 20-30cm.
- Maintain a fill-free space between the dirt cap and the inside bump log.
- Where required to accommodate water flow, a culvert may be used in conjunction with a log fill.

Log Culverts



- For streams where other resource agencies require the culvert to be open bottomed.
- For steep gradient streams.
- Have an expected service life of 4-6 years
- Have a span of less than 6m centre-to-centre, and an abutment height of less than 4m
- Has a separation layer, is covered with soil and lies below the road surface
- Have logs free from cracks, excessive taper, sweep, damage or large knots
- Are long enough to contain the fill and prevent material from entering the stream

Standards:

- Are suitable for ephemeral or perennial stream flow
- Require a geometric design for fills depths over 2m or design discharge is 6m3/sec or greater
- Must accommodate peak flow (see the BC Engineering Manual for more information and design discharge criteria)

17. Invasive Plants

Invasive Plants

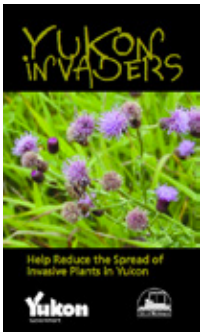
Invasive plants have been identified in Yukon. They can negatively impact:

- Forestry operations by competing with seedlings for light, nutrients, and water; and
- Water quality and quantity by increased erosion and sedimentation

Invasive plants are spread through several key pathways including increased travel and trade; transportation, seed mixtures (revegetation), humans, etc.

Prevent their introduction, establishment and spread

- Prevent invasive species from entering into new areas.
- Don't import plants, plant parts or seeds that are already known to be a problem elsewhere.
- Watch for invasive species in your project area and report any sightings.
- Wash any equipment that may have come into contact with known invasive species prior to moving to another area.
- Check and remove plant parts and mud from vehicles.



Report new findings to: Yukon Invasive Species Council
Email: info@yukoninvasives.com

18. Spills & Access Control

Standards:

Take these steps immediately after you identify a spill:

- Report the spill: 867-667-7244 or to an Environment Yukon Environmental Protection Officer at 867-667-5683.
- Notify the owner or person in charge of the spilled substance and any person who may be adversely affected by the spill.
- If you are responsible for the spill, take all reasonable measures to confine the spill and restore the site to the same condition that it was in before the spill.
- Remediation of a spill site must be conducted in accordance with the Contaminated Sites Regulation.

- The Environmental Protection Officer has the authority to ensure that the site is cleaned up, and any costs incurred will be billed to the person responsible for the spill.

- A spill kit should be stored at each site where spills could occur and on each vehicle that may have a spill. For more information refer to Environment Yukon's Cleaning Up Contaminated Sites webpage.

Access Control – Gates and Signage

- Gates are used as access control measures for seasonal restrictions, environmental protection and safety.

Standards:

- Signs are mandatory on FRR.
- Access is limited to authorized users and for authorized purposes.
- FRR users must abide by posted signs.

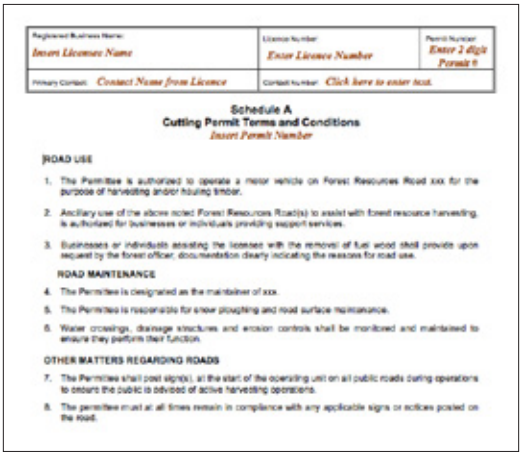
19. Permitting

Permits are required for FRR:

- A harvesting licence and cutting permit can be obtained by commercial timber harvesters, or
- A forest resources road permit, can be used when the road is constructed by someone other than a commercial harvester.

To apply:

- Visit a CMI district office or FMB in Whitehorse, Mile 918 Alaska Highway.
- Call ahead and make an appointment with an Area Forester 1-800-661-0408 ext. 3999 or 1-867-456-3999.
- Submit applications as early as possible – the site may require additional assessments (e.g. engineering or stream).



Registered Business Name:	Licence Number:	Permit Number:
Insert Licensee Name	*Enter Licence Number*	*Enter 3 digit Permit #*
Primary Contact: *Contact Name from Licence*	Contact Number: *Click here to enter text.*	

Schedule A
Cutting Permit Terms and Conditions
Insert Permit Number

ROAD USE

1. The Permittee is authorized to operate a motor vehicle on Forest Resources Road xxx for the purpose of harvesting and/or hauling timber.
2. Ancillary use of the above noted Forest Resources Road(s) to assist with forest resource harvesting, is authorized for businesses or individuals providing support services.
3. Businesses or individuals assisting the licensee with the removal of fuel wood shall provide upon request by the forest officer, documentation clearly indicating the reasons for road use.

ROAD MAINTENANCE

4. The Permittee is designated as the maintainer of xxx.
5. The Permittee is responsible for snow ploughing and road surface maintenance.
6. Water crossings, drainage structures and erosion controls shall be monitored and maintained to ensure they perform their function.

OTHER MATTERS REGARDING ROADS

7. The Permittee shall post sign(s), at the start of the operating unit on all public roads during operations to ensure the public is advised of active harvesting operations.
8. The permittee must at all times remain in compliance with any applicable signs or notices posted on the road.

***Yukon Environmental and Socio-Economic Assessment Act* (YESAA):**

- Has mandatory timelines and is required prior to issuing a permit
- Is required for projects which propose activities regulated under the Assessable Activities Regulation (AAR) (e.g. moving earth with power driven machinery, installation of culverts, etc.)

20. Engineering Designs & Security

Some situations may warrant the use of engineered drawings to reduce risk of FRR failure, impacts to environmental values, and to ensure safety.

FMB has the following engineering designs for use when planning FRR. Please contact FMB for copies of any of the following:

Available Engineering Designs

- Typical Ditch Block with Culvert
- Typical Culvert Installation
- Typical Hand Placed Rip-Rap Culvert End Treatment
- Culvert Installations Hand-Placed Rip-Rap Quantities
- Metal Flume Detail
- Typical Waterbar
- Typical Earthwork X-Section
- Typical Stripping Section
- Typical Centerline Profile
- Typical Horizontal Curve
- Typical Off Take Ditch
- Resource Access In Earth Cut
- Resource Access On Fill
- Obliteration of Abandoned Roadways

Use of engineering designs may contribute to reducing the amount of additional licence security required for potential restoration and remediation.

Security

High risk projects require increased licence or permit security costs to remedy any environmental impacts should an incident occur.

The security deposit is refundable should no incidents occur.

Example:

A proposed permanent FRR with several fish stream crossings

- Would have a higher level of risk, and
- Require an increased amount of security deposit.

In the event of a landslide the deposit is used for rehabilitation of aquatic habitats and replacement of damaged infrastructure.

Those projects utilizing available engineering designs, a geometric design, or the services of a professional engineer may result in reduced security.

21. Inspections & Maintenance

Compliance and Enforcement

Compliance, Monitoring and Inspections (CMI) Natural Resource Officers:

- Are designated Forest Officers who conduct inspections, investigations and enforcement
- Can implement compliance tools such as warnings, notices, protection orders, investigations and fines
- Conduct inspections which may be in conjunction with harvesting permit inspections

Inspection items include:

- Gates & signage, running surface, ditches & erosion controls, culverts and any other features of the FRR

Maintenance:

Inspections and maintenance must be conducted at sufficient intervals as to ensure safety on the FRR, as well as protecting environmental resources. It is the designated maintainer's responsiblity to conduct routine inspections, identify corrective action required and implement remediation.

- Clear debris from culverts, ditches, dips, and other drainage structures to prevent clogging that can lead to washouts.
- Place the debris where it cannot be washed back into these structures or into open water
- Shape road surfaces to maintain proper surface drainage.
- Fill in ruts and holes with gravel or compacted fill as soon as possible to reduce erosion potential.
- Remove berms along the edge of the road if they will trap water on the road.

Standards

- Hazards identified during inspections or during use of FRR must be reported and rectified as soon as possible.
- Ensure users are notified of hazards if remedial action cannot be implemented immediately.

22. Decommissioning

Standards:

- Stabilize the road prism and clearing width.
- Restore or maintain surface drainage patterns, and control subsurface drainage, consistent with natural drainage patterns.

- Commitments for decomissioning come from the FRA and higher level plans.
- Minimize the impact of silt and sediment transport on other forest resources.
- Site plans contain a list of responsibilities, activities and timeframe for decomissioning.
- Deactivation includes installation of cross ditches, water bars, trench drains and blanket drains.

Examples and diagrams for installation of these items are available in the **BC Forest Road Engineering Guidebook**.

Decommissioning Goals		
Goal	**Standard**	**Timeframe**
Deactivation – general practice	• Prevent access through placement of barriers and gates • Restore natural drainage and remove culverts • Re-establish plant growth on site	At completion of activities or an interim measure between planned activities where access control is required.
Rehabilitation – specific management	• Restore natural drainage • Restore stability and ecological function • Decompacting the soil and rolling back organic debris • Re-establish plant growth or reforestation on site	At completion of activities for a harvest area where future access is not required and environmental values require specific management.

For establishment of native grass and shrub species the **Yukon Revegetation Manual** is a good resource for determining appropriate vegetation compositions.

23. Other Legislation

Environment Act

Administered by Environment Yukon, regulated activities include; fuel storage and handling, solid waste management, hazardous waste management, air emissions and the assessment and clean-up of spills.

Environmental and Socioeconomic Assessment Act (YESAA)

Administered by YESAB, an independent, non-government board, YESAB looks at the potential effects a proposed activity may have on the economy, environment, health, culture, and on heritage resources and then considers measures that could be used to eliminate or reduce any identified negative impacts.

Fisheries Act (Canada)

Administered by Fisheries and Oceans Canada, Fisheries Protection program, is mandated to protect and conserve fish habitat in support of Canada's coastal and inland fisheries resources.

Forest Protection Act

Administered by the department of Community Services, Wildland Fire Management; regulating fire prevention and control, requiring reporting and extinguishing in accordance with a burning permit.

Highways Act

Administered by the Department of Highways and Public Works; ensuring safe and efficient public highways, airstrips, buildings and information systems. The *Highways Act* directs activities on maintained highways and HPW is the lead agency for works on public roads and right of ways.

Historic Resources Act

Administered by the Department of Tourism and Culture to manage and preserve archaeology sites and collections, and to manage and protect Yukon's archaeological resources.

23. Other Legislation

Lands Act

Administered by the Land Management branch and guides land and land use activities such as; sale of lots, land applications, land use permitting, and quarry permits.

Migratory Birds Convention Act

Environment Canada administers the *Migratory Birds Convention Act* and the Canadian Wildlife Service (CWS) provides advice related to the application of the current regulation.

Occupational Health and Safety Act

Administered by the Yukon Workers' Compensation Health and Safety Board; guides safe activities in the workplace, identifies rights and responsibilities, addresses workplace injuries and provides requirements for training, reporting and investigations.

Placer Mining Act

Administered by the Mineral Resources branch, the *Placer Mining Act* regulates exploration and mining activity for placer gold.

Quartz Mining Act

Administered by the Mineral Resources branch, the *Quartz Mining Act* regulates hard rock prospecting, exploration and mining.

Summary Convictions Act

Contains the penalties for which an offence under the FRA may be administered.

Wildlife Act

Administered by Environment Yukon, Conservation Officer Services the Wildlife Act regulates hunting, fishing and trapping activities, as well as ensures habitat and wildlife management and protection.

Waters Act

Administered by the Yukon Water Board – responsible for the issuance of water use licences for the use of water and/or the deposit of waste into water. An application for a water use licence must be accompanied by a decision document issued under YESAA.

Yukon Land Claim Final Agreements

Lead by First Nations Governments and YG Aboriginal and Relations Division, the Agreements include land, compensation, as well as guaranteed representation on a variety of boards and councils relating to management of land, water, fish and wildlife and heritage resources.

24. Glossary of Terms

Adverse Grade – loaded vehicles going up-hill, towards the mill.

Ballast – gravel or broken rock placed on the sub-grade.

Clearing Width – area cleared of trees to allow for construction, maintenance and other road-related functions. Must be located fully within the Right of Way.

Corduroy – A material, usually logs, used to separate the wet subgrade from the finished grade and to distribute the live load.

Due Diligence – taking all reasonable precautions to prevent or avoid a non-compliant occurrence.

Favorable Grade – loaded vehicles going down-hill, towards the mill.

Guideline – a general rule or piece of advice, recommended practices, best practices that may or may not be followed.

Higher Level Plans – includes Forest Resources Management Plans and Timber Harvest Plans established under the FRA.

(Ordinary) High Water Mark – The visible high water mark of any lake, stream, or other body of water.

Right of Way – the width of the permit area within which the permit holder has a non-exclusive right to enter and construct a road.

Riparian Areas – Vegetated areas adjacent to a watercourse or water body that directly contribute to fish habitat by providing shade, cover and food production areas.

Rip Rap – placement of rocks or other materials in a watercourse and along the water's edge to protect banks, culverts, or other structures from erosion.

Road Prism – the road cross-section from the top of cut to toe of fill. It includes subgrade, grade and ditches.

Soil Compaction – compression of soil; gouging, rutting, blading, scalping, or otherwise making a noticeable change to the forest floor by repeated machine traffic.

Standard – a minimal level of quality or attainment, items that you must adhere to or exceed in order to avoid compliance action.

Stripping – a removal of unsuitable materials (usually organic) to one side of the clearing width.

Subgrade – a suitable surface prepared to receive embankment fill or road base materials if needed. The travelling surface of the road.

Substrate – primary or underlying material on which other materials (such as ballasting for surfacing or organic soils for road decommissioning) are applied.

Contact Names and Phone Numbers

Forest Fire Reporting: _____

Fisheries and Oceans: 1-866-845-6776 ReferralsPacific@dfo-mpo.gc.ca

Forest Management Branch: 1-800-661-0408 (ext. 3999) or 867-456-3999

YWPA Contact _____

Canadian Wildlife Service: (867) 393-6700 _____

Compliance Monitoring and Inspections: _____

Yukon Spill Report Line: 867-667-7244 _____

Conservation Officers: 867-667-8005 _____

Other: _____

Other: _____

Glossary – abbreviations

AAR	Assessable Activities Regulation
CMI	Compliance Monitoring and Inspections
DFO	Department of Fisheries and Oceans
FMB	Forest Management Branch
FRA	Forest Resources Act
THP	Timber Harvest Plan
YESAA	Yukon Environmental & Socioeconomic Assessment Act
YESAB	Yukon Environmental & Socioeconomic Assessment Board
ROW	Right of way

References

- BC Forest Road Engineering Guidebook
- BC Road Engineering Guidebook;
  Appendix 5: Tables to Establish Clearing Width
- BC Fish Stream Crossing Guidebook
- Best Management Practices for Works Affecting Water in Yukon
- Environment Yukon, Best Management Practices for Works Affecting Water in Yukon
- FRA Soil Conservation Standards & Guidelines
- FRA Riparian Area Management Standards & Guidelines
- Handbook for Fish Habitat Protection on Forest Lands in B.C.
- Northern Land Use – Roads and Trails
- NWT Field Guide to Ice Construction Safety, 2007
- Occupational Health and Safety Regulations – Part 12
- Yukon Revegetation Manual

Yukon
Energy, Mines and Resources
Forest Management