



# BIG LAKES COUNTY POLICY



<b>TITLE:</b>	<b>Road Maintenance Policy</b>		
<b>POLICY NUMBER:</b>	PW-08		
<b>LEGAL AUTHORITY:</b>			
<b>APPROVED BY COUNCIL:</b>	March 8, 1995		
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## POLICY STATEMENT

Big Lakes County recognizes a need to establish standards with respect to road maintenance. This policy will set forth levels of service established through Council. Council shall provide the necessary equipment, manpower and budget to achieve road maintenance levels of service.

## PROCEDURE/RESPONSIBILITY

Road maintenance operations shall be provided year round as per current Big Lakes County procedural manuals and any applicable legislation governing such works.

## POLICY

### 1.0 WINTER MAINTENANCE

#### **1.1 Winter Operations**

##### **1.1.1 Guideline**

Snow removal and ice control operations differ throughout the County due to influences of terrain, precipitation, temperature, wind, chinooks, etc.

##### **1.1.2 Procedures**

To assist in providing timely response during changing winter conditions, maintenance staff must keep informed of weather forecasts. News of advancing storms must be communicated to the Director of Public Works.

The basic strategy for snow removal and ice control is: first - remove as much snow or ice as possible with suitable plowing equipment and second - treat any remaining snow or ice with sand, salt, or a sand/salt combination to achieve good winter driving conditions within the required time frames. Plowing and deicing activities will continue as weather and operational conditions permit with the aim of **eventually** achieving bare pavement.



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Steep hills, curves, important intersections, and other areas known to create difficulties for traffic should be attended to first.

Priority shall be given to higher volume local roads to provide the best service to the greatest number of motorists.

When roadway surface temperatures are too low for the use of salt, calcium chloride, or other deicing chemicals, only sand should be applied to maintain the best possible winter driving conditions. After the surface temperature of the roadway rises, lighter applications of deicing chemical will remove snow and ice accumulations more quickly and economically.

Once good winter driving conditions have been achieved along all routes, "cleanup" activities including the plowing of shoulders, crossovers, approaches, etc. can be started if snow and ice deposits are significant enough to be considered a hazard to traffic. Cleanup activities are usually best left to daylight hours and off peak traffic times.

Local roads are to be kept open to traffic as long as conditions permit.

Occasionally severe storms require that local road closures be implemented. Under the Highway Traffic Act, the Chief Administrative Officer has the authority to close highways. The public must be advised of road closures through the media. It is important to ensure that news of the road re-opening is transmitted to the public promptly.

Snow and ice control operations are often carried out under adverse driving conditions making special safety precautions necessary. Lights and warning flags must be checked frequently to ensure they are in good condition, operating properly and as visible as possible.

County employees are each responsible for ensuring that they comply with all provisions of the Highway Traffic Act. While Section 68.3 of the Highway Traffic Act does allow County units engaged in construction and maintenance operations to operate on any portion of the highway, this does not mean that the operator is relieved of the responsibility of operating the unit in a safe and responsible manner. Extra caution must be employed when performing vehicle maneuvers that other traffic using the highway is not expecting. On heavily travelled roadways traffic control may be necessary.

Except in extreme emergencies, an employee should not operate equipment beyond a maximum of 15 continuous hours or as outlined in the National Safety Code. Staggering of working hours to eliminate long hours of continuous operation for individual employees must be implemented during prolonged storms.



### 1.2 Snowplowing

#### 1.2.1 Guidelines

Snowplowing of paved local roads should be commenced when snow accumulations exceed 3 centimeters and before the snow becomes packed by traffic. In certain circumstances, such as at hills, curves, bridges, intersections, etc., snowplowing operations may commence earlier.

**The County will make a reasonable effort to open roads within 72 hours following a snowstorm.** The County will require its contract grader operators to have a substitute driver to cover off their absences.

Snowplowing operations, during and immediately after a storm, should be continued for as long as possible so that traffic does not pack excessive amounts of snow onto the roadway. It can take many days to remove packed snow and ice, especially during the short, cold days in December and January when there is very little heat available from the sun to assist with melting.

If visibility is reduced to below 75 meters, or when, in the opinion of the equipment operator and the foreman, it is too hazardous to continue snowplowing, the equipment shall be removed from the roadway to a safe location.

The RCMP and local radio stations should be advised. Snowplowing should be resumed as soon as visibility improves sufficiently to allow operation at an acceptable level of safety.

Snowplowing operations on lower volume gravel roads should commence when snow accumulations have reached 10 to 15 centimeters, or when snow drifting is creating problems. Specific details on snowplowing of gravel roads are contained in Section 4 Gravel Surface Maintenance - Winter.

#### 1.2.2 Procedures

Snow conditions dictate the type of equipment to be used to clear snow off the roadway. The majority of snow removal is performed with snowplow trucks because of their speed and versatility. When snow accumulations and drifts exceed 60 cm, alternate equipment may be required. Graders equipped with V-plows, 4-wheel drive tractors equipped with dozer blades or V-plows and snow blowers can be used. Wings on graders may be used to either clear a wider path or to wing snow down the shoulder.

When snowplowing with trucks, speed must be adjusted to meet snow, wind and traffic conditions. Speeds of 50 to 70 km/hr are considered reasonable for most conditions. The



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angle of the snowplow blade on snowplows should be adjusted to remove snow and ice from the roadway in the most effective manner.

Plowing dry snow into the wind creates large snow clouds ("whiteouts") which reduce, or eliminate, visibility for following and oncoming traffic. This condition increases the possibility of accidents. Slower snowplow operating speeds can help reduce these whiteouts.

Speeds should be reduced when plowing wet snow and slush to avoid damaging other vehicles and obscuring or damaging signs.

Snowplows should pull over at reasonable intervals, usually about 5 kilometers, to allow traffic the opportunity to pass. When traffic is heavy, or rearward visibility is obscured this interval should be shortened. Pulling over helps reduce any frustration experienced by motorists following the snowplow.

Care shall be taken when plowing drifted and packed snow which could cause the operator to lose control. Plows may dig into packed snow, or ice, and cause damage to equipment if an appropriate operating speed is not used.

When approaching railway crossings, operators shall take special care to ensure that blades, plows and skid plates on equipment are raised sufficiently to clear the tracks. Care shall be taken to ensure that snow or ice is not deposited on the crossing.

Any damage to the crossing must be reported immediately to the area foreman, who will contact the railway operator. Snow banks must not be allowed to reduce the sight distance and obscure railway traffic from motorists.

On short sections of roadway (i.e. guardrail) it may be necessary to clear heavy drifts from the entire width of the road surface before proceeding to plow the remaining roadway. This allows traffic to proceed through these areas with less difficulty.

Graders equipped with wings and plows are normally used to clear snow from gravelled roads. When snowplow trucks are used to clear snow on gravelled roadways they should be operated at lower speeds than when plowing on paved roadways. Care must be taken to ensure that aggregate is not plowed off the roadway. Snowplowing of gravelled roadways is discussed in detail in Section 4 Gravel Surface Maintenance - Winter.

When snowplowing on recently seal coated sections of local paved roads, care must be taken to avoid removing the new seal coat surfacing with snowplows. Methods used to eliminate damage to the seal coat surface, especially in the first year, include double blades on the plow, snowplow shoes, power floats, castor wheels, rubber and Neoprene blades.



### 1.3 Application of Salt and other Ice Control Chemicals

#### 1.3.1 Ice Control Guidelines

Under many conditions, the application of proper amounts of deicing chemicals onto the roadway will help to remove packed snow, ice or frost thereby improving traction and driving conditions. Salt (sodium chloride) and calcium chloride are the primary deicing agents used by the County.

Deicing chemicals shall only be used on ice, frost or snow which cannot be removed by snowplowing.

The application rate of salt varies considerably, depending on the surface condition being treated and the current and forecasted weather conditions. Experience and judgement must be used when determining the application rates. Only the amount of salt necessary to do the job must be used. The proper use of deicing chemicals represents a cost efficient and effective use of resources.

Timing of the application of salt is critical, especially when conditions for its use are marginal. There is little heat available from the sun in December and January and, ideally, salt is applied just as the surface begins to warm. This will help ensure that the salt is on the roadway surface during the warmest part of the day. Following these practices will maximize the effectiveness of salt in removing snow and ice.

Use of salt when the temperature of the road surface is below -10 degrees Celsius is not justifiable. Salt loses its effectiveness rapidly under this temperature, and excessive amounts are necessary to achieve melting action. Refer to Section 1.4, Sanding for snow and ice removal procedures under low temperature conditions.

When conditions are favorable, salt applied during early stages of a snowfall will prevent the bond from forming between the pavement and packed snow. Much less salt is required to prevent the bond from forming than to melt packed snow after the snowfall has ended.

Time is of the essence when chemical applications are involved. Often snow, sleet, and freezing rain are created by rapidly advancing cold air. Temperatures can drop dramatically in a matter of hours. Any necessary chemicals must be applied quickly to allow as much time as possible for them to work. If timing of snowplowing and chemical applications are right, the local paved road will "freeze dry". At low temperatures too much diluted brine on the roadway will freeze to ice.

The following chart provides guidelines for adjusting salt application rates under varying conditions.



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Rates kg of Salt per 2 lane km	Conditions (Road and Weather)	Factors Affecting Salt Application Rate
50	<ul style="list-style-type: none"> <li>- temperature near 0° Celsius</li> <li>- light amounts of snow/ice/frost</li> </ul>	INCREASE RATE WHEN: <ul style="list-style-type: none"> <li>- temperatures are lower or falling</li> <li>- road surface is cold</li> <li>- increased amounts of snow/ice/frost</li> <li>- traffic flow is light and won't help break up ice</li> </ul>
125	<ul style="list-style-type: none"> <li>- temperature near -6° Celsius</li> <li>- moderate amounts of snow/ice</li> </ul>	
225	<ul style="list-style-type: none"> <li>- temperature near -10° Celsius</li> <li>- thicker ice/snow</li> <li>- FOR TEMPERATURES BELOW -10° CELSIUS REFER TO "SANDING (SECTION 16.0)</li> </ul>	DECREASE RATE WHEN: <ul style="list-style-type: none"> <li>- temperature surface is rising</li> <li>- road surface is warm</li> <li>- the sun is warming the road surface</li> <li>- there are lesser amounts of snow/ice</li> <li>- traffic volume is higher and will help break up ice</li> </ul>

**Note:** This chart refers to the amount of salt in a sand/salt mixture.

**For example:** If spreading a 50 - 50 mix of sand and salt at the suggested salt application rate of 50 kg per 2 lane kilometer the total amount of 50 - 50 material being spread on the road would be 100 kg per 2 lane kilometer.

**Caution: DO NOT USE SALT (SODIUM CHLORIDE) OR CALCIUM (CALCIUM CHLORIDE) OR OTHER CORROSIVE CHEMICALS ON AIRPORT RUNWAYS, TAXIWAYS AND APRONS AS SERIOUS DAMAGE CAN OCCUR TO SPECIALIZED METALLIC COMPONENTS ON AIRCRAFT.**

**UREA, OR SAND WITHOUT DEICING CHEMICAL, CAN BE USED ON RUNWAYS, TAXIWAYS AND APRONS.**

### 1.3.2 Ice Control Procedures:

Inventories of salt (sodium chloride), calcium (calcium chloride) and sand must be monitored throughout the winter season to ensure adequate supplies are on hand.

Increased local paved road inspection and patrol are necessary, especially when weather conditions are changing.

The first priorities are to provide ice control at intersections, railway crossings, hills and curves.



When spreading salt, to remove ice and snow, a spread less than one meter wide on the highest side of curves, or near the crown, will allow the higher salt concentration to quickly clear a bare area and traffic will then work the brine to the lower side of the roadway. The brine will work its way along the surface, breaking the ice bond.

Newly constructed base courses, new pavements, and older, smooth pavements may have ice form on them more quickly than rough textured surfaces.

Ongoing patrols will be required to ensure that salt applications are effective and to pick up any areas missed or requiring additional treatment.

### 1.4 Sanding

#### 1.4.1 Guidelines

Sanding will improve traction and provide better winter driving conditions when temperatures are too low for the effective application of ice control chemicals. Typical sand application rates for providing traction are 1,000 kg/2 lane km for heavy sanding, 700 kg/2 lane kilometer for normal sanding, and 500 kg/2 lane kilometer for reapplication of sand or light sanding.

#### 1.4.2 Procedures

It is sometimes necessary to use a sand and salt mixture to provide a melting action. When this is done, the rate of application must be established by calculating how much salt is in the load and the mixture spread following the salt application rates in Section 1.4.1. Deicing chemicals are the only agents that melt ice. Sand is an abrasive which provides some traction. Given that sand does not, by itself, melt ice, the spreading of straight salt at the correct application rates is less costly under certain circumstances.

Additional salt (or other deicing chemical) added to the winter sand should be thoroughly mixed prior to loading.

Sanding operations can be carried out at speeds ranging up to 60 kilometers per hour. The spinner must be controlled to obtain the desired spread width. The guard on the spinner must be regularly checked for proper adjustment in order to direct the material properly onto the roadway. The speed of the unit and wind will affect the spread pattern of the material. Excessive speed will cause larger particles to bounce off of the roadway and possibly cause damage to other vehicles.

The spinner should be turned off to avoid damaging vehicles which are approaching or passing the sanding unit. In heavy traffic it is sometimes necessary to sand only one lane at a time to avoid damaging other vehicles.



When temperatures are near -20° Celsius, calcium chloride may be added to help imbed the sand particles in the ice. Adding 0.5 to 1.5 percent by weight of calcium chloride will promote this effect. The addition of too much calcium chloride will cause tracking and create icing.

If snow is blowing across the highway without sticking, sand shall not be applied unless the highway is dangerously slippery, as the sand will cause the snow to stick, aggravating drifting and icing problems.

### 1.5 Ice Blading

#### 1.5.1 Guidelines

This operation is carried out when deicing chemicals are not effective and involves removal or roughening of ice and packed snow from the paved roadway surface with the aim of achieving good winter driving conditions. Ice blading on gravel roads is described in Section 4.0 Gravel Surface Maintenance - Winter.

#### 1.5.2 Procedures

The operator shall tight blade the travel lanes first and roll the material onto the outer lanes. Disposal of this excess material off of the roadway should be done such that it will not hinder traffic or future snowplowing or sanding operations.

As the temperature warms, conventional ice and snow control methods shall be followed.

The mold board tilt angle and circle positions should be adjusted to achieve the best results possible under prevailing conditions.

Special care must be taken when ice blading to avoid gouging into the pavement surface or seal coat. Blades which use milling teeth must not be used to remove ice on pavement.

Frequent checks must be made of the cutting edges to prevent damage to the mold board.

## 2.0 PATCHING

### 2.1 Guidelines

All local road surfaces must be kept in a condition suitable for safe travel at the posted speed limit. Keeping the surface of all roads in a safe condition is the number one priority maintenance item.



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Breaks in the pavement surface, which pose a hazard to traffic, must be attended to immediately. Warning signs must be placed on each side of the break until repairs can be effected. It is not satisfactory to leave warning signs for an extended period of time. Permanent repairs must be completed as quickly as possible.

Oxidized pavement, hairline cracks, separated pavement and roller cracks, if left unattended, will eventually develop into more serious pavement failures. (They can usually be treated by fog sealing, sand sealing or slurry sealing, etc.)

Before leaving the job site, any centre line obscured by patching activities should be spotted for subsequent repainting.

When working on any roadway it is essential to exercise proper safety procedures (signing, flagpersons, hard hats, traffic cones, safety vests, etc.) for protection of the work crew as well as the roadway user.

Repairs are required for various types of failures such as:

- pot holes
- alligator failures
- rutting
- wide cracks
- sub-base failures
- depressions and settlements
- spalling and ravelling

## 2.2 Procedure

### 2.2.1 Conventional hand patching for pot holes, wide cracks and small alligator failures.

- Define the boundaries of the patch
- Remove all loose pavement and any loose or unstable base material
- Apply a tack coat of suitable bonding asphalt to the cleaned surface and edges. A light tack coat is all that is required prior to placing patching material.
- Patching material shall be raked and levelled slightly higher than the surrounding roadway to allow for compaction.
- The edges shall be feathered and large aggregate removed to allow a smooth transition from roadway to patch.
- Compaction will then proceed from the low side to the high side of the pavement width, leaving the completed patch at the same cross-fall gradient as the surrounding roadway surface.



### 2.2.2 Sub-base failures which require full depth repairs

- If the area has a history of failure, appears very wet or will require extensive or complex repairs, the Director of Public Works shall be contacted prior to the work proceeding.
- Define the limits of the patch and remove all existing pavement, loose base material and saturated subgrade material. If sub-grade excavation is required, subsurface drainage of the excavated area, to the sideslope, must be provided.
- Backfill the excavated area with suitable granular material to within 200 mm of the pavement surface. The granular material shall be placed in layers and each layer thoroughly compacted. Once compaction of the granular material is complete, apply a prime coat and tack the edges of the pavement with a suitable bonding asphalt.
- Place the asphalt patching material in layers not exceeding 100 mm and thoroughly compact each layer. Hot mix asphaltic concrete is the preferred material for this type of patching.
- The finished surface of the patch should be smooth and slightly higher than the adjoining pavement to allow for long term settlement. There should be smooth transitions at each end of the patch.

### 2.2.3 Thin layer skin patching for depressions, settlements, ravelling, rutting, and larger alligator crack areas.

The material is usually placed with a motor grader. In situations where long patches are required, the use of an asphalt paver may prove to be beneficial.

- Define the boundaries of the patch.
- Remove all loose material.
- Apply a tack coat of suitable bonding asphalt to the cleaned surface of the area to be patched. Ensure that the tack coat extends approximately 3 meters beyond the edge of the patch.
- Spread and level the patching material and feather the edges. Remove coarse particles before compaction.
- Thoroughly compact the patch with appropriate compaction equipment.



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**2.2.4** When repairing localized settlements, the patching material should be placed in successive, compacted, layers of 100 mm until the depression is filled. If further strengthening of the area is required a skin patch may be placed in accordance with Section 2.2.3.

**2.2.5** During inclement weather conditions products such as Instant Road Repair, Q.P.R. 2000, cold mix or blends produced from locally available materials may be used for patching pot holes or excavations made to correct localized surface distortions, etc.

- Remove all loose material from the area to be patched. When conditions are wet or cold, heat may be used to dry or warm the pavement.
- Place enough material in the depression so that the compacted patch is slightly higher than the surrounding pavement. This allows for future compaction and settlement of the patching material.

### 2.3 Safety

- Patching is, by necessity, performed while the highway is being used by the travelling public. Be aware of the traffic, stay alert and have an escape route planned.
- Work shall not be performed until certified and properly equipped flagpersons are in place.
- Work shall not be performed until appropriate work zone signing is in place.

### **3.0 GRAVEL SURFACE MAINTENANCE - SUMMER**

The purpose of gravel surface maintenance is to provide a reasonably smooth and safe roadway for the motoring public, taking into consideration weather and traffic conditions.

#### **3.1 Guidelines**

Weekly road inspections should be carried out to ensure the required level of service is maintained. Residential and Farm Access Roads may be inspected less frequently.

To establish the rate of blading to maintain the required level of service, traffic volumes, weather and general road conditions will all have to be considered. The following may be used as a guide for summer maintenance:



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Local Roads Paved	Once weekly
School bus routes on local roads	Once every two weeks
Residential Roads	Once monthly
Farm Access Roads	Twice during summer months

### 3.2 Procedures

- The roadway shall be bladed to remove all pot holes, washboards and ruts. When blading road surfaces, shoulders should be kept free of grass and ridges to prevent moisture build-up. Sod lumps should be worked across the roadway to separate gravel material and break up lumps.
- The finished roadway should have a uniform crown of 3 - 5%.
- All curves must be bladed in such a manner as to maintain the designed super elevation.
- When blading bridge approaches, material shall be carried up to the edge of the deck. Excess material shall be back bladed to keep the deck free of excess material.
- When blading approaches to cattle guards ensure that material is not carried forward past the leading edge of the guard to fill in the excavated area beneath the cattle guard.
- Railway crossings shall be treated in the same manner as bridge decks. The crossing must be inspected by the operator to ensure no material has been deposited on the crossing or in the flangeways.
- Roadways shall be bladed through intersections with the material spread back evenly to eliminate ridges and provide a smooth surface. The crown on the main roadway shall be maintained through the intersection while the crown on the intersecting roadways should be feathered back.
- Areas that are not smooth and firm after normal blading may require additional attention. Minor repairs on small holes and soft areas may be performed by scarifying the area, and then blading out, reworking and re-laying the material. In some instances, additional granular material may be required to complete the work.
- Windrow eliminators **may** be used to keep gravel windrows to a minimum.
- The operator shall remove all large rocks that appear on the roadway during regular blading.



### 3.3 Safety

- The motor grader must be equipped with headlights, taillights, four-way flashers, back up alarm, revolving light, slow moving symbol and warning flags on the outward edges of the cab and moldboard.
- Appropriate signing should be in place while performing road work.
- During the summer, work areas should be restricted to maximum lengths of 3 to 5 km.
- Windrowed material shall not be left on the roadway overnight, however, if an emergency requires a windrow to be left overnight adequate warning devices must be in place.
- Extreme caution must be exercised when maneuvering while blading intersections.

### 4.0 GRAVEL SURFACE MAINTENANCE - WINTER

Plowing of gravel surface roadways should be commenced before snow accumulations reach 10-15 cm on the roadway. However, if drifting conditions prevail, plowing operations may be commenced sooner. In general, winter maintenance schedules are determined by weather conditions.

#### 4.1 Guidelines

Priority shall be given to school bus routes and high traffic volume routes. Overall priorities shall be determined using local information.

- During the first snow fall, it is desirable to mix enough snow into the loose gravel to stabilize the surface material when it freezes. This minimizes future gravel loss from snowplowing.
- Farmland access will not be snow plowed during normal winter snowplowing operations.
- Plowing of farmland access roads may be considered for economical considerations (i.e. farm operations).

#### 4.2 Procedures

- Ice blading may become necessary if the roadway becomes slippery due to compacted snow or ice. Ice blading roughens the surface for improved traction. Care must be taken to minimize gravel loss.



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- Winging of snow into the ditch will be necessary before plowed snow accumulates to a depth of 30 cm along the shoulder edge.
- The wing shall be raised at approaches to feather out the snow thus preventing the formation of a windrow.
- Plowing of approaches and driveways may be commenced when the plowing of roadways has been completed.

### **5.0 GRAVEL ROAD SHOULDER MAINTENANCE**

#### **Pulling Shoulders**

Shoulder maintenance may be required to redefine and reshape roadway shoulders to an acceptable cross section.

#### **5.1 Guidelines**

Pulling shoulders may be required when the shoulders of the roadway push out, the crown rate of the roadway becomes flatter than 1%, or the cross section is wider than designed and not properly draining. Prior to any regravelling, roadways should be inspected to determine whether pulling shoulders is required.

#### **5.2 Procedures**

- Engineering surveys may be needed to re-establish shoulder lines.
- To minimize damage, the ends of culverts shall be marked and affected signs removed.
- Utilities must be located prior to commencement of work.
- Graders, or other suitable equipment, shall be used to windrow material from the sideslope onto the roadway.
- Material shall be broken up and then spread over the roadway. The use of a pulv-mixer or tractor disc may be required for this operation.
- Foreign objects and other debris shall be removed before the material is spread, watered and compacted.
- This process may need to be repeated until an acceptable cross section is obtained.



- The roadway shall be regravelled as soon as possible after shoulder pulling.
- Damaged culverts shall be repaired and all necessary signs re-installed.

### 5.4 Safety

- Work zone signs must be in place.
- Flag people may be required depending on traffic volumes, work conditions and topography. Warning lights and barricades may be required if all work is not completed before nightfall.
- Larger stones shall be cleared from the roadway before the work can be considered complete.

## 6.0 REGRAVELLING

The excessive loss of gravel from a roadway results in a loss of traction, a reduction in strength, rutting and deterioration of the roadway and sideslopes. Regravelling of a roadway improves the riding quality, stabilizes and strengthens the roadway and restores the surface to an all-weather driving condition.

### 6.1 Guidelines

Gravelled roadways require regravelling, on average, once every three years. Information on the condition of the roadways should be collected early in the spring to determine where regravelling is required that year. A roadway should be considered for regravelling when it exhibits any of the following characteristics:

- Excessive loss of surface gravel
- Numerous bald or shiny spots
- Clay balls on the shoulders after blading
- Excessive rutting

#### 6.1.1 Recommended Regravelling Rates

The condition, type, width and traffic volume of a roadway will dictate the application rate of gravel. Gravel quantities should be weighed on a scale, however where this is not practical truck box volumes are acceptable. The following are recommended rates of application:



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Type	Tonnes/km
Local Roads	200 - 250

### 6.2 Procedures

#### 6.2.1 Roadway Preparation

Prior to regravelling, the roadway should be reshaped to the proper crown and width. Sometimes it may be necessary to "pull shoulders" (refer to Gravel Surface Maintenance - Summer, Section 3.0 and Gravel Road Shoulder Maintenance Section 5.0).

#### 6.2.2 Spreading Gravel

- When dumping, special attention must be given to overhead powerlines. Prior to the start of the haul proper signing must be in place to warn workers of the hazard (e.g. WD-176).
- The spread distance for each load of gravel should be marked on the roadway by the gravel checker.
- Gravel dumped on the roadway shall be equalized by windrowing before it is spread over the surface.
- On roadways with an Average Annual Daily Traffic (AADT) higher than 50, the gravel should be spread to the shoulders.
- On roadways with an AADT less than 50, the gravel should be spread to one meter from the shoulders.
- Care shall be taken to maintain the crown and super elevation of the roadway.
- Windrowed or unspread gravel, shall not be left on the roadway overnight, however, if an emergency requires windrowed or unspread gravel to be left overnight adequate warning devices must be in place (see signing diagram TEB 1.15 in the Traffic Control Standards manual).

#### 6.2.3 Haul Road for Operations

- The local road authority must be consulted prior to the commencement of haul operations on roads under their jurisdiction.
- During gravel hauls, the haul roads must be regularly maintained to provide reasonably smooth and safe roadways for the motoring public.



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- Dust control materials should be applied where required (e.g. in front of residences, at intersections, on hills and curves).
- The haul road should be checked at least twice per day to ensure that maintenance and dust control operations are effective.
- Appropriate signs indicating that trucks and graders are working shall be erected along the haul route (e.g. WD-A-41).

### 6.2.4 Gravel Pit Operations

- When loading from a stockpile, the loader operator shall work from the base of the stockpile in order to utilize as much of the gravel as possible. Care must be taken not to contaminate the gravel with the underlying materials.
- All pits and stockpile sites must be kept tidy and organized. Garbage must not be disposed of within the sites.
- No working face shall have a vertical height of more than 1.5 meters (five feet) above the maximum reach of the excavation equipment.
- Positive drainage on the site must be maintained.
- When pit operations are completed all stockpile and pit faces must be sloped in accordance with the pit operation plan.
- It is beneficial to all users of the pits or stockpile sites to know the type of gravel in each stockpile. This can be done by marking the gravel designation and class (e.g. 4-20) on the side of a drum and then placing the drum beside the appropriate stockpile. The drum should be filled with gravel to prevent it from being easily moved or blown over.

## **7.0 RAILWAY CROSSING MAINTENANCE**

Railway crossing maintenance is required to ensure a safe crossing for the motoring public and the railway operator.

### **7.1 Guidelines**

Crossings should be maintained to provide for the safe, smooth movement of traffic. Debris, gravel, snow and ice resulting from roadway maintenance operations should be removed from the flangeways and roadway. Loose planks shall be reported to the railway operator as soon as possible.



All railway crossings should be inspected. Visual checks should be performed more frequently on those crossings that are known to have deficiencies.

### 7.2 Procedures

When roadway maintenance affects the operation of the railway, the railway operator must be notified prior to the start of work.

Appropriate work zone signing and certified flag persons, proper equipped, must be in place prior to commencement of maintenance work.

#### 7.2.2 Gravel Surface Crossings

- Crossings on gravelled roadways are primarily maintained with a motor grader while performing regular surface maintenance on the roadway.
- If pot holes are present, the surface material shall be bladed up to the crossing and then back bladed to feather out excess material thus ensuring a smooth crossing. Occasionally additional gravel may be required.
- After blading, an inspection must be carried out immediately by the operator to ensure that material has not been deposited in the flangeways and that no damage has been done. Any material that has been deposited on the crossing must be removed manually.
- Any damage to the crossing must be reported immediately to the foreman, who will contact the railway operator.

#### 7.2.3 Winter Maintenance

- Operators shall take special care to ensure that blades, plows and skid plates on equipment are raised sufficiently to clear the tracks.
- After crossing, operators shall check to ensure the tracks are clear of ice and snow and have not been damaged. Any snow or ice on the crossing should be removed.
- Any damage to the crossing must be reported immediately to the area foreman, who will contact the railway operator.

### 7.3 Safety

All railway crossings should be signed in accordance with standards, advance warning symbols and highway markings.



All brush should be cleared to provide sight distance which meets the standards set forth by the Transport Canada Railway Safety Directorate.

### **8.0 SIGNING**

Signs are used to advise of traffic regulations, warn of changes in roadway characteristics and hazards, as well as provide information necessary to motorists. The Alberta Highway Signing Manual, Traffic Control Standards manual and the Uniform Traffic Control Devices for Canada Manual provide guidelines for signing along the highway system.

#### **8.1 Standard Roadside Signing**

##### **8.1.1 Guidelines**

All new and replacement signs installed shall be no closer than 4 - 6 meters from the shoulder line and the bottom edge of the sign should be at least 1.5 meters above the roadway. Posts should be plumb and the signs level. The posts may be painted white.

Signs should be kept clean. Hot water and steam will damage the reflective sheeting of the sign. Warm water is an acceptable cleaning agent.

All signs must be inspected annually to ensure that they are reflective and legible during hours of darkness. Lighting for overhead signs shall be checked at the same time and any necessary repairs arranged.

##### **8.1.2 Procedures**

- All roads should be checked on a regular basis to ensure that all signs are in place, functional and conform to established standards.
- Repair or replace defective or damaged signs as soon as the necessary resources are available.
- Prior to drilling or digging any post holes all underground utilities must be located. Not all utility companies are registered with Alberta First Call. Please make note of these additional utilities in your work zone.
- Larger signs are usually installed with the sign service truck. Smaller signs are often installed utilizing hand tools.
- Regular cleaning of the signs is necessary to ensure satisfactory visibility and reflectivity.



### 8.2 Breakaway Signs

#### 8.2.1 Guidelines

Signs larger than 3 sq. m (32 sq. ft.) should be placed on breakaway bases to minimize the potential for injury and vehicle damage if struck by vehicles leaving the roadway. Damaged breakaway signs shall be replaced as soon as possible. Shear bolts should be checked periodically for proper torque so that the breakaway feature will work as it is intended.

#### 8.2.2 Procedures

- Should a sign post become damaged carefully remove the sign from the post.
- Accurately determine size of required breakaway sign post.
- Critical signs may have to be temporarily erected on wooden posts.
- Once the new sign posts have been delivered, cut the flange at the hinge point. All cuts or scores to the metal posts must be painted with galvicon.
- Attach fuse plate and torque the bolts according to the Traffic Control Standards Manual

Erect the sign posts and torque the bolts according to the table in Section 5.

Bolt the sign to the wind frame as shown on TEB 1.71 and TEB 1.72 in the Traffic Control Standards manual.

### 9.0 DELINEATORS

Delineators, which are sometimes referred to as guide posts, are installed to assist motorists during periods of limited visibility. Delineators are used at changes in road alignment, at changes in roadway width, for marking roadside hazards, and as a guide for turning movements.

Delineators shall consist of reflectorized material on a suitable support. The reflectorized material shall consist of high intensity reflectorized sheeting or a similar material. The supports may consist of a material that will allow the delineators to return to a vertical position when hit. Suitable materials include tubular plastic and fiberglass compounds.



### 9.1 Guidelines

Delineators should be located in accordance with the warrants described in the Design Guide for Traffic Barriers section of the Traffic Control Standards Manual. This Design Guide also contains Plan TEB 3.49, TEB 3.50, and TEB 3.51 referred to in this section.

Delineators are to be vertical and located approximately 0.6 meters from the shoulder of the highway.

#### 9.1.1 Curves

Delineators shall be placed on the outside of curves only.

#### 9.1.2 Transitions

When marking transitions of pavement width, such as from two lane to four lane, the suggested spacing of delineators is 30 meters.

#### 9.1.3 Roadside Hazards

Delineators are not warning devices. Appropriate warning signs must be used to advise the motorist of hazards.

Where delineators are used to help define a roadside hazard, a spacing of 60 meters is recommended.

When a guardrail end treatment is turned away from the local paved road, one delineator is required in advance of the guardrail.

Three delineators are required in advance of a guardrail end treatment which has been buried near the edge of the pavement. Refer to Plan TEB 3.51 for the suggested spacing.

No delineators are required beyond the hazard.

### 9.2 Turning Movements

Acceleration and deceleration ramps shall be delineated in accordance with plans TEB 3.49 and TEB 3.50.

Delineation of interchange ramp loops and curves shall be as indicated in the chart for horizontal curves on Plan TEB 3.49.

Gore areas at deceleration and acceleration ramps are delineated as specified on Plan TEB 3.50.



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Installation of delineators on local paved road crossovers and public approaches is specified in Section 2 of the Design Guide for Traffic Barriers.

### 9.3 Procedure

- Locate underground utilities near work area.
- Put up work zone warning signs and flagging protection.
- Mark guidepost locations.
- Drill holes.
- Place posts at correct heights.
- Tamp in place.
- Clean up area, pick up work zone signs.

### 10.0 MOWING

#### 10.1 Guidelines

Vegetation along local road rights-of-way is mowed for the following reasons:

- to eliminate obstruction to sight distance on curves
- to control weed and brush growth
- to reduce snow drifting on the roadway
- to provide for unobstructed drainage
- to reduce the fire hazard in some areas
- to improve road aesthetics
- to eliminate obstruction to signs
- to increase the visibility of large animals on the right-of-way



### 10.2 Procedures

- Mowing should commence when vegetation reaches a height of 30 centimeters. Weed control is most effective when mowing is done when the plants are in the flower stage.
- Vegetation should be mowed to a height of 10-15 centimeters.
- All highway sideslopes must be mowed. The first cut, 4.5 meters in width, should be completed during the early summer months (June/July). A second shoulder cut may be necessary in late fall dependent on regrowth. Local paved roads should receive a minimum of one 2 meter shoulder cut.
- Trimming is necessary around sign posts, culverts, guardrail, delineators, curbs, piers, abutments and other structures and should be completed within five days after cutting.
- All slopes 3:1 or flatter should be mowed. A 2 meter wide shoulder cut will normally be required for slopes that are steeper than 3:1 and higher than 3 meters.
- High fills with guardrail should be mowed so that the top of the vegetation is below the level of the outside roadway edge.
- Hay permits are issued in many areas of the province to allow landowners to take the hay. Adjacent landowners are given the first opportunity for these hay permits subject to certain conditions covered in the hay permits. Hay permits are included in this section.

### 11.0 CRACK SEALING

#### 11.1 Guidelines

The purpose of cracksealing is to prevent moisture from penetrating the base and subgrade thereby weakening the roadway structure. It also prevents material spalling from the edges of the cracks. Cracks, that are wide enough to accept crackfiller, should be sealed as early as possible in the spring. Under certain conditions some sections of local roads may not require annual crackfilling (e.g. well drained subgrades). The earlier this function can be completed, the more successful it will be in minimizing moisture penetration. All cracksealing should be completed prior to June 30.

Various asphaltic materials are acceptable for cracksealing. The usual materials used in Alberta are cold pour and catalytic crack, joint sealer hot pour and various types of hot pour rubberized cracksealers.



In order to provide for proper accommodation of traffic, cracksealing must be carried out on one lane at a time with signs and properly attired flagpersons directing traffic. Signing must be in place in accordance with the appropriate signing diagram in the Traffic Control Standards manual.

### 11.2 Procedures

Paved surfaces will be sealed as follows:

- Cracksealing is to be performed when the pavement surface and the cracks are dry, or nearly dry, and the temperature is above 0° C and rising.
- All cracks between 5 and 25 millimeters in width should be cracksealed.
- Roadways that are scheduled for overlay, or seal coat, in the current year shall not be cracksealed.
- Proper sealing of cracks involves placing sealant up to the level of the pavement surface. Excess sealant is struck off with a squeegee working from the centre line to the shoulder.
- To keep tracking to a minimum, cracksealing material should be squeegeed even with the pavement surface and traffic should be kept off until the asphalt has cured. If tracking occurs, because of unavoidable circumstances, a blotting material such as sand can be used to absorb excess cracksealing material.

### 12.0 DUST CONTROL

Dust control is used to minimize health and safety hazards caused by severe dust conditions on gravel roadways.

#### 12.1 Guidelines

Dust control material may be applied to selected roadways, intersections, on curves, hills, in Hamlets and in front of residences and other public places. This activity is usually initiated late in the spring.

##### 12.1.1 Recommended Application Rates

The following are recommended rates of application:



## 12.2 Procedures

Type	kg/sq.m
Flake calcium chloride	0.75
Liquid calcium chloride	0.75 - 1.25
Lignosulphanates	0.75 - 1.25 (50% dilution)
Petroleum based products i.e. spec. crude	suppliers recommended rate
Water	as required

- Identify the sections of roadways to be treated.
- Blade and regravell these sections as required.

### 12.2.1 If Using Flake Calcium Chloride

- Apply water liberally to the prepared roadway.
- Apply flake product at required rate.
- Thoroughly mix the gravel and flakes by windrowing and then spread the mixture evenly over the roadway.
- Lightly rewater and compact with a rubber tired roller (if available).

### 12.2.2 If Using Liquid Chemical Products

- Apply water liberally to prepared roadway.
- Apply liquid product at required rate.
- Compact with rubber tired roller (if available).

### 12.2.3 If Using Petroleum Products

- Lightly dampen the prepared roadway in accordance with the supplier's recommendations.
- Apply and mix the dust control product in accordance with the suppliers recommended rate and procedure.



### 12.2.4 Special Instructions

- Prior to reworking any calcium chloride treated areas the surface must be moist. This moisture reactivates the chemical and improves workability of the treated material.
- During extended periods of dry weather, it is advisable to periodically dampen calcium chloride treated areas to improve the effectiveness of the product.
- When repairing lignosulphanate treated areas the pot holes should be moistened, filled with a mixture of granular material and lignosulphanate and then compacted.
- Repairs to areas treated with petroleum based products will vary depending on the type of product used.

### 12.3 Safety

- Certified and properly equipped flag persons may be required depending on traffic volumes and worksite location.

## 13.0 GUARDRAIL REPAIR

### 13.1 Guidelines

Roadside barriers are intended to prevent vehicles from leaving the roadway and encountering a fixed object or a terrain feature that is considered more hazardous than the barrier itself. Guardrail installation and repairs must be completed in accordance with the Design Guide for Traffic Barriers in the Traffic Control Standards manual.

Damaged guardrail should be repaired as soon as possible. A record of a detailed repair costs must be kept.

Installations should be evaluated if the guardrail causes snow drifting hazards that are more severe than the original hazard the guardrail was intended to protect against. Also, accident experience at specified site may supersede guardrail warrants. In specified situations the use of guardrail configurations other than the standard flex beam guardrail may be warranted.

### 13.2 Procedures

- Determine where guardrail should be repaired.
- Arrange for required materials, equipment and human resources.



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- Arrange to locate all utilities in the immediate area.
- Schedule repairs and proceed with the work in accordance with drawings in the Barrier Section of the Traffic Control Standards manual.
- The recommended height of the centre bolt of the guardrail is 540 mm (21 inches) above the road surface. This height should not be less than 460 mm (18 inches). If the height of the centre bolt is not within this range senior staff must be consulted. Variations from this range are permissible to accommodate future road construction.
- Care shall be taken when installing or replacing guardrail to ensure that the posts are properly aligned, at the correct height and well tamped.
- Rail sections must be overlapped in the direction of traffic flow.
- When re-installing guardrail all posts shall be checked for splitting, checking, rot, etc.
- Reflective sheeting shall be applied to every third post. In special situations this spacing may be decreased.
- Guardrail and the reflective sheeting should be cleaned at regular intervals to remove dirt and road film.
- When setting guardrail height, always check roadway variations and adjust post height accordingly to produce a smooth continuous line.
- When placing guardrail at bridge ends always start the guardrail construction at the bridge.

### **14.0 DRAINAGE SYSTEMS**

Drainage systems are constructed and maintained to collect, control and direct water from the road while maintaining natural drainage patterns. Culverts and other structures are provided to facilitate the passage of water from natural drainage courses through the road.

In order to maintain a roadway in optimum condition, water must be kept from saturating the subgrade and also from eroding the roadway. Because uncontrolled water can be one of the greatest natural destructive forces affecting a road, it is very important that all structures and other features of the drainage system are well designed and maintained in good operating condition.

To preserve drainage systems, maintenance may be required in the following areas:



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- Ditches
- Ditch Blocks
- Down Drains
- Bridges
- Culverts
- Curbs
- Beaver Dams
- Subsurface Drains

Any maintenance of drainage systems must be approached with caution to ensure that surrounding property owners are not adversely affected.

### 14.1 Ditches

#### 14.1.1 Guidelines

Ditches that become silted in or blocked can result in flooding as well as altering of natural drainage patterns. Periodic maintenance of ditches may be required to ensure that drainage patterns are functional and that they are capable of carrying their design flows.

Eroded areas should be repaired as soon as possible in order to minimize safety hazards, eliminate bank instability, and reduce siltation of culverts and water courses.

#### 14.1.2 Procedures

- All ditches, especially those with heavy flows and those subject to flooding and erosion, should be inspected in the spring or during other periods of runoff. Items to note include blocked culverts, erosion, siltation, water flow, vegetation loss and damage to erosion structures.
- A drainage system maintenance plan should be developed in conjunction with the spring inspection. Work should commence as soon as scheduling and conditions allow to minimize further erosion and to maximize time available for necessary re-vegetation.
- Before any alterations are performed to existing water courses or water bodies, appropriate approvals must be obtained from the applicable agencies (Alberta Environment, Alberta Fish and Wildlife, etc.).
- Suitable disposal areas for the excavated material must be identified. If a proposed disposal area is on private property, a written agreement must be entered into with the landowner, and tenant if applicable. The agreement must be approved before the work commences. (General Release of All Demands Form).
- Always locate all underground utilities prior to commencing ditch clean-out operations. (CALL BEFORE YOU DIG). Not all utility installations are registered with



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Alberta First Call. The area should be checked thoroughly for signs of utilities that may not be registered.

- Accumulated silt, debris and other obstructions can then be removed from the ditches. All eroded ditches should be repaired and revegetated. For more severe problems erosion control installations may be required.
- When cleaning silted-in ditches, care shall be taken to ensure that the resultant ditch bottom is as flat as possible and that the original ditch gradeline is not substantially altered.
- It is recommended that the ditch grade be checked with an engineer's level (or hand level) during clean out in order to ensure positive drainage.
- Ensure that the final ditch grade ties into the existing structures (i.e. ensure that the ditch bottom is not below the culvert inverts).
- Certain ditches may require removal of accumulated snow to allow spring runoff to flow freely.

### 14.2 Culverts

#### 14.2.1 Guidelines

The capacity of culverts is reduced dramatically when damaged, or blocked by silt, debris, or ice. In order to ensure the integrity of the road drainage system, culverts must be maintained to allow water to flow freely.

#### 14.2.2 Procedures

- Repair or replace damaged culverts as soon as possible.
- Each fall suspect culverts should be checked to ensure that they are not plugged with silt or debris. This will help to reduce drainage problems.
- Culverts prone to freezing should be inspected in the early spring. During runoff those that are plugged with ice should be thawed open.
- Silt in culverts can be cleaned out using pressurized water or other suitable methods. Corrective action should be considered to minimize siltation of the culvert.
- Scours at the inverts of culverts should be repaired and protected with rip rap.



### 14.3 Beaver Dams

#### 14.3.1 Guidelines

- Beavers build dams to create ponds in which they can build their houses. Beaver dams are often built in or near culverts and across water courses near roads which can cause flooding of the surrounding area. In some cases, this flooding reaches the roadway which results in additional damage.
- Beavers which build problem dams should be removed from the area. Beaver dams should be removed or breached if flooding problems are anticipated. Dams in culverts should always be removed. Dams should be removed as required during the summer. Follow-up inspections should be made prior to freeze-up.

#### 14.3.2 Procedures

- Some dams can be breached or destroyed with backhoes or other equipment.
- Dams can also be destroyed by blasting. The only person who can directly supervise this type of work is one who holds a valid "blasting ticket".
- Permission must be obtained from the landowner, and tenant if applicable, prior to entering private property for the purpose of destroying beaver dams.
- Beavers should be trapped or removed from the area or else they will rebuild the dam. Alberta Fish and Wildlife will advise on the appropriate procedures to follow for the trapping and removal of beavers.
- Dams in culverts can be rammed out using a long tree trunk or other similar type of ram.
- Dams in culverts can be blasted with explosives. However, care must be taken not to damage the culvert.
- There are several cage-like devices that fit on the end of culverts. These products, although expensive, can help to stop beavers from damming a culvert. If these cages are used, they should be checked at least once per year and all accumulated debris removed.

### 15.0 BRUSH CONTROL

Removal of brush along roads is required to improve sight distance at intersections and curves, restore proper drainage in ditches, reduce snow drifting problems and allow for dissipation of dust clouds created by traffic on gravel roads.



### 15.1 Guidelines

Areas where brush control work will be required shall be documented throughout the year. Brush control requirements shall be reviewed, prioritized, and a program should be developed in early fall.

Brush control should be performed before the vegetation reaches 2 meters in height or earlier if sight distance is affected. Brush control shall be planned so as to keep the size of the vegetation reasonably small. In most areas this work is performed once every three years.

Upon completion of brush control work the remaining vegetation should not exceed 15 cm in height. Brush cuttings that are larger than 10 cm in diameter or longer than 50 cm should be properly disposed of.

Brush control work required at most intersections, to provide for proper sight distance, is contained within an area represented by an isosceles triangle with 100 meter sides along the roadways (see figure 15.1). At some intersections and curves, brush control may be required on private land in order to provide for proper sight distance.

### 15.2 Procedures

Prior to any mechanical brush control operations, all utility pedestals, monuments, culverts, etc. should be flagged to ensure their visibility.

Any temporary cables laying on the ground should be placed along the fenceline. If it is not possible to move the cable it shall be flagged or raised off the ground.

Brush control may be carried out using a variety of methods. The brush may be cut with chainsaws and burned or otherwise disposed of. The brush may also be cleared and piled with a dozer or cut and chopped up by a variety of brush mowers.

All worksites must be checked at least once a day to ensure that the required clean-up operations are being followed, material is being properly disposed of and debris is not being left on the roadway, approaches or private land.

### 15.4 Special Instructions

When brush control operations are required on private land, written agreements must be obtained from the landowner prior to the commencement of work.

Fire permits may be required for burning brush piles depending on the season and location.

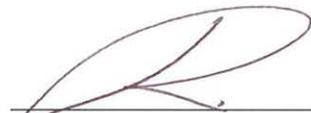


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### 15.5 Sight Triangles

The operator of a vehicle approaching an intersection should have an unobstructed view of the whole intersection and a length of the intersecting highway sufficient to permit control of the vehicle to avoid collisions. In the case of all highway intersections at grade, the minor highway or road is controlled by a stop sign.

For busy intersections and primary highway sight distance triangle, refer to the Highway Geometric Design Standards manual.

  
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Reeve

  
\_\_\_\_\_  
Chief Administrative Officer

  
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Date of Final Signature