

**82 IAM**  
**INDIAN AFFAIRS MANUAL**

**BIA TRANSPORTATION  
FACILITIES  
MAINTENANCE  
HANDBOOK**

**for**

**BIA ROAD MAINTENANCE PROGRAM**



**BUREAU OF INDIAN AFFAIRS**  
**Division of Transportation**  
**Washington, D.C.**

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## **1. INTRODUCTION**

- 1.1. Purpose.** This document describes the methodology and basic guidelines for the Bureau of Indian Affairs Road Maintenance Program.
- 1.2. Mission Statement.** The mission of the Bureau of Indian Affairs (BIA) is to enhance the quality of life, promote economic opportunity, and carry out the responsibility to protect and improve the trust assets of American Indians, Indian Tribes and Alaskan Natives. The BIA will accomplish this through the delivery of quality services, maintaining government-to-government relationships within the spirit of Indian Self-Determination.
- 1.3. Overview.** In 1951, Congress began appropriating general funds for the maintenance of BIA owned roads in the annual Department of Interior (DOI) appropriation acts. To comply with 23 USC 204, the DOI includes maintenance appropriations in their annual budgets. As a condition for the continuance of Federal Lands Highway Funds (Highway Trust Funds) for improvements and in accordance with 23 USC 116, the BIA Region and Agency Offices are responsible for proper maintenance of BIA transportation facilities (using DOI funds) to protect the public investment and provide safe transportation for tribal members and the general public.

In 2005, Congress passed PL 109-59 SAFETEA-LU which states:

*MAINTENANCE OF INDIAN RESERVATION ROADS.—Section 204(c) of such title is amended by striking the second and third sentences and inserting the following: “Notwithstanding any other revision of this title, of the amount of funds allocated for Indian reservation roads from the Highway Trust Fund, not more than 25 percent of the funds allocated to an Indian tribe may be expended for the purpose of maintenance, excluding road sealing which shall not be subject to any limitation. The Bureau of Indian Affairs shall continue to retain primary responsibility, including annual funding request responsibility, for road maintenance programs on Indian reservations. The Secretary shall ensure that funding made available under this subsection for maintenance of Indian reservation roads for each fiscal year is supplementary to and not in lieu of any obligation of funds by the Bureau of Indian Affairs for road maintenance programs on Indian reservations.*

The BIA, in cooperation with the Federal Highway Administration (FHWA) is responsible for conducting random Maintenance Program inspections concerning the expenditure of appropriated funds. The Federal Highway Administration (FHWA) should be included in inspections concerning the expenditure of Highway Trust Funds. The actual maintenance activities are performed by BIA, Indian tribal governments under Public Law 93-638 contracts, compacts, intergovernmental cooperative agreements, or by other methods.

## **2. DEFINITIONS BY CATEGORY**

**2.1. Purpose.** The BIA uses many terms in operation of the transportation facilities maintenance program. These terms come from many sources and are usually defined in reference documents as definitions or glossaries. This section defines some of those most recognized terms, and groups them according to category.

### **2.2. Administration.**

Deferred Maintenance. Maintenance work that is deferred to a future budget cycle, or postponed, until funds become available.

Deferred Maintenance Report. The tabulation of cost differences between costs associated with restoring BIA transportation assets to original condition and actual expenditures.

Department of Interior Funding. Road maintenance funds appropriated by the DOI for maintenance activities that restore applicable transit or transportation facilities to original condition.

Recommended Earth Road Maintenance Frequency. Depending on fund availability, it is recommended that BIA public improved and unimproved roads should be maintained a minimum of 2 times per year, one maintenance cycle per 6 months. School bus routes should be given priority over other earth roads. Depending on fund availability, school bus routes should be maintained a minimum of 4 times per year, one maintenance cycle each quarter. Snow plowing is considered emergency maintenance required to keep the roads passable.

Government Performance Results Act (GPRA). Enacted in 1993 as a means to quantify the results of work performed; requires government agencies to submit annual performance plans to Congress along with fiscal year budget requests. The purpose is to provide a method of setting performance goals and tracking and reporting results of pursuing those (road/bridge maintenance) goals.

GPRA Reporting. Quarterly report of the quality of work performed.

Highway Trust Funds (HTF). Funds that may be expended to perform applicable maintenance activities as defined in PL 109-59 (SAFETEA-LU)

Maintenance Agreement. An approved and duly signed document allowing an entity to perform maintenance activities on transportation facilities under the jurisdiction of another entity.

Manual on Uniform Traffic Control Devices (MUTCD). Contains uniform standards for traffic control devices. All BIA road maintenance traffic control procedures and devices used on public roads are required by law to conform to the MUTCD.

Negligence. Failure to use reasonable care. While no governmental agency is considered to be an absolute insurer for safety along its roads, it is required to maintain the roads in a reasonably safe condition. A governmental agency can be deemed negligent if it knows, or has been notified of, a dangerous condition and fails to safeguard against it. Methods of safeguarding include an approved and proper road closure or installation of appropriate approved warning signs.

Public Transit and Transportation Facilities. Can include, but is not limited to: roads, bridges, low water crossings, parking lots, airports, traffic lights, sidewalks, recreation areas, visitor kiosks, bus stops, bus shelters, bus barns, ferries, street lights, bicycle/pedestrian paths, motorized vehicle trails.

Right-of-Way, Implied ROW, Easement, Maintenance Corridor, Grant of Entry. The historical or documented formal process through which the jurisdictional authority expresses agreement of involved parties, if certain conditions are met in writing or implied by a court to use land (all or in part) of another permanent or temporary status for a specified purpose and distinguished from the right to possess land.

Traffic Control Device Warrant. Used by the engineer to determine the potential safety and operation benefits of traffic control devices. It is based on average of normal conditions.

Tort Claim. Means a claim for a civil wrong calling for compensatory monetary damages. It is the result of an overt act or omission that results in an injury, loss, or diminution in property value. Generally results from a failure to act in a reasonable, prudent fashion.

Technical Assistance. The information and knowledge which the BIA shares with a Tribe on request.

Transportation Facilities Maintenance Management System (TFMMS). A tool used by BIA and Tribes to budget, prioritize, and schedule transportation facility maintenance activities. It will be used to extend the service life of an IRR transportation facility, ensure safety, and report future funding needs to the Secretary.

### **2.3. Accounting.**

Allotment. An action by administrative authority making funds available for obligations and expenditures for specified purposes and for certain periods.

Apportionment. An administrative assignment of funds based on a prescribed formula by a governmental unit to another governmental unit for specific purposes and for certain periods.

Appropriation. An act of a legislative body which makes funds available for expenditures with specific limitations as to amount, purpose and period.

Budget. A plan showing estimates of costs and revenues for proposed activities for a given period.

Charges, Direct. Costs which can be identified specifically with a product, service or activity.

Charges, Indirect. Costs which cannot be identified readily with a product, service or activity, the distribution of which should be made by proration.

Equipment Rental Rate. Equipment usage charges usually established on a time- or mileage-use basis, including direct costs, indirect costs and depreciation.

Expenditures. A term applicable to accrual accounting, meaning total charges incurred, including expenses, provision for retirement of debt, and capital outlays. The making of a payment is a disbursement.

## **2.4. Bridges.**

Bridge. A structure including supports erected over a depression or an obstruction, such as water, highway or railway, and having a track or passageway for carrying traffic or other moving loads and having an opening measured along the center of the roadway of no less than twenty feet between undercopings of abutments or spring lines of arches or extreme ends of opening for multiple boxes; may include multiple pipes where the clear distance between openings is less than half of the smaller contiguous opening.

Bridge Length. The greater dimension of a structure measured along the center of the roadway between backs of abutment backwalls or between ends of bridge deck.

Bridge Roadway Width. The clear width of structure measured at right angles to the center of the roadway between the bottom of curbs or, if curbs are not used, between the inner faces of parapet or railing.

Culvert. Any structure under the roadway with a clear opening of twenty feet or more measured along the center of the roadway.

Substructure. Any structural, load-supporting component generally referred to by the terms abutment, pier, retaining wall, foundation or other similar terminology.

Superstructure. All of that part of a structure above the bearings of simple and continuous spans, skewbacks of arches and top of footings of rigid frames; excluding backwalls, wingwalls and wing protection railings.

## **2.5. Contract Administration.**

Calendar Day. Any day shown on the calendar, beginning and ending at midnight.

Constructive /Field Change. An unauthorized change in the contract which is requested, directed, or approved by a government employee other than the Contracting Officer. Only the Contracting Officer or Awarding Official may authorize contract changes.

Contract. The written agreement between the contracting agency and the contractor setting forth the obligations of the parties thereunder for the performance of the prescribed work.

Contract Item. A specific unit of work for which a price is provided in the contract.

Contract Payment Bond. The security furnished to the contracting agency to guarantee payment of prescribed debts of the contractor covered by the bond.

Contract Performance Bond. The security furnished to the contracting agency to guarantee completion of the work in accordance with a contract.

Contract Time. The number of working days or calendar days allowed for completion of the contract.

Contractor. The individual, partnership, firm, corporation, joint venture, or any acceptable combination thereof, contracting with the highway agency for performance of prescribed work.

Plans. The contract drawings which show the location, character, and dimensions of the prescribed work; including layouts, profiles, cross sections and other details.

*As-Built Plans.* Final copy of the plans of the completed project showing all changes in the work.

*Standard Plans.* Drawings approved for repetitive use, showing the agency's standard construction processes, methods, or details to be used where specified in the plans.

*Working Drawings.* Supplemental design sheets or similar data which the contractor is required to submit to the engineer such as stress sheets, shop drawings, erection plans, falsework plans, framework plans, cofferdam plans, and bending diagrams for reinforcing steel.

Special Provisions. Additions and revisions to the standard and supplemental specifications applicable to an individual project.

Specifications. The compilation of provisions and requirements for the performance of prescribed work.

*Standard Specifications.* A book of specifications approved for general application and repetitive use.

*Supplemental Specifications.* Approved additions and revisions to the standard specifications.

Subcontractor. The individual, partnership, firm, corporation, joint venture, or any acceptable combination thereof, to which the contractor sublets part of the contract.

Superintendent. The contractor's authorized representative in responsible charge of the work.

Work. The furnishing of labor, materials, equipment and incidentals necessary or convenient to the successful completion of the project and the carrying out of the project and the duties and obligations imposed by the contract.

Working Day. A calendar day during which normal construction operations could proceed for major part of the shift; normally excludes Saturdays, Sundays, and holidays.

## **2.6. Cross Section.**

Crosswalk. Any portion of the roadway at an intersection or elsewhere distinctly indicated for pedestrian crossing by line or other pavement markings. An engineering study should be performed before crosswalks are installed away from STOP signs or traffic signal.

Curb Loading Zone. Roadway space adjacent to a curb and reserved for exclusive use of vehicles during loading or unloading of passengers or property.

### Lane.

*Auxiliary Lane.* The portion of the roadway adjoining the traveled way for parking, speed change, turning, storage for turning, weaving, truck climbing or for other purposes supplementary to through traffic movement.

*Median Lane.* A speed-change lane within the median to accommodate left-turning vehicles.

*Parking Lane.* An auxiliary lane primarily for the parking of vehicles.



*Speed-Change Lane.* An auxiliary lane, including tapered areas, primarily for the acceleration or deceleration of vehicles entering or leaving the through traffic lanes.

*Traffic Lane.* The portion of the traveled way for the movement of a single line of vehicles.

Median. The portion of a divided highway separating the traveled ways for traffic in opposite directions.

Roadside. A general term denoting the area adjoining the outer edge of the roadway. Extensive areas between the roadways of a divided highway may also be considered roadside.

Roadway. General: The portion of a highway, including shoulders, for vehicular use. A divided highway has two or more roadways. In construction specifications: The portion of a highway within limits of construction.

Shoulder. The portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles for emergency use, and for lateral support of base and surface courses.

Traveled Way. The portion of the roadway for the movement of vehicles, exclusive of shoulders and auxiliary lanes.

## **2.7. Earthwork.**

Backfill. Suitable material used to replace or the act of replacing material removed during construction; also may denote material placed or the act of placing material adjacent to structures.

Borrow. Suitable material from sources outside the roadway prism, used primarily for embankments.

Embankment. A structure of soil, soil-aggregate or broken rock between the embankment foundation and the subgrade.

Embankment Foundation. The material below the original ground surface, the physical characteristics of which affect the support of the embankment.

Selected Material. Suitable native material obtained from roadway cuts or borrow areas or other similar material used for subbase, roadbed material, shoulder surfacing, slope cover, or other specific purposes.

Scarify. To loosen the surface of a roadway.

## 2.8. Highway Types.

Expressway. A divided arterial highway for through traffic with full or partial control of access and generally with grade separations at major intersections.

Freeway. An expressway with full control of access.

Highway. A general term denoting a public way for purposes of vehicular travel, including the entire area within the right-of-way.

Arterial Highway. A general term denoting a highway primarily for through traffic, usually on a continuous route.

Bypass. An arterial highway that permits traffic to avoid part or all of an urban area.

Divided Highway. A highway with separated roadways for traffic in opposite directions.

Major Highway. An arterial highway with intersections at grade and direct access to abutting property, and on which geometric design traffic control measures are used to expedite the safe movement of through traffic.

Radial Highway. An arterial highway leading to or from an urban center.

Through Highway. Every highway or portion thereof on which vehicular traffic is given preferential right-of-way, and at the entrances to which vehicular traffic from intersecting highways is required by law to yield right-of-way to vehicles on such through highway in obedience to either a stop sign or a yield sign, when such signs are erected.

Road or Street. A general term denoting a public way for purposes of vehicular travel including the entire area within the right-of-way. (Recommended usage: in rural areas – road; in urban areas – street.)

Local Road. A road primarily for access to residence, business, or other abutting property.

Street. A general term denoting a public way for purposes of vehicular travel, including entire area within the right-of-way. (Recommended usage: in urban areas – highway or street; in rural areas – highway or road)

Cul-de-Sac Street. A local street open at one end only and with special provision for turning around.

*Dead-End Street.* A local street open at one end only without special provision for turning around.

*Local Street.* A street or road primarily for access to residence, business, or other abutting property.

*Major Street.* An arterial highway with intersections at grade and direct access to abutting property, and on which geometric design and traffic control measures are used to expedite the safe movement of through traffic.

*Through Street.* Every highway or portion thereof on which vehicular traffic is given preferential right-of-way, and at the entrances to which vehicular traffic from intersecting highways is required by law to yield right-of-way to vehicles on such through highway in obedience to either a stop sign or a yield sign, when such signs are erected.

## **2.9. Intersection.**

*Cross Connection.* A connecting roadway between two nearby and generally parallel roadways.

*Gore.* The area immediately beyond the divergence or convergence of two roadways, bounded by the edges of those roadways.

*Grade Separation.* A crossing of two highways, or a highway and a railroad, at different levels with no access between them.

*Overpass.* A grade separation where the subject highway passes over an intersecting highway or railroad; also called “overcrossing”.

*Underpass.* A grade separation where the subject highway passes under an intersecting highway or railroad; also called “undercrossing”.

### Intersection Elements

*Angle of Turn.* The angle between two intersection legs.

*Intersection Entrance.* That part of an intersection leg for traffic entering the intersection.

*Intersection Exit.* That part of an intersection leg for traffic leaving the intersection.

*Intersection Leg.* Any one of the highways radiating from and forming part of an intersection. The common intersection of two highways crossing each other has four legs.

*Island.* A defined area between traffic lanes for control of vehicle movements or for pedestrian refuge. Within an intersection a median or an outer separation is considered an island.

*Median Opening.* A gap in a median provided for crossing and turning traffic.

*Merging End.* An end of an island, or area between converging roadways, beyond which traffic merges.

*Minimum Turning Path.* The path of a designated point on a vehicle making its sharpest turn.

*Minimum Turning Radius.* The radius of the minimum turning path of the outside of the outer front tire. (Vehicle manufacturers' data books give minimum turning radius to the centerline of the outer front tire.)

*Turning Movement.* The traffic making a designated turn at an intersection.

*Turning Path.* The path of a designated point on a vehicle making a specified turn.

*Turning Roadway.* A connecting roadway for traffic turning between two intersection legs.

*Turning Roadway Terminal.* The general area where a turning roadway connects with a through traffic roadway. "Exit" used as a modifier refers to leaving the through traffic lanes and "Entrance" refers to entering the through traffic lanes.

*Turning Track Width.* The radial distance between the turning paths of the outside of the outer front tire and the outside of the rear tire which is nearest the center of the turn.

### Intersection types

*At-Grade Intersection.* An intersection where all roadways join or cross at the same level.

*Channelized Intersection.* An at-grade intersection in which traffic is directed into definite paths by islands pavement markings and/or signing.

*Flared Intersection.* An unchannelized intersection, or a divided highway intersection without islands other than medians, where the traveled way of any intersection leg has been widened or an auxiliary lane added.

*Four-Leg Intersection.* An intersection with four legs, as where two highways cross.

*Multi-leg Intersection.* An intersection with five or more legs.

*Roundabout.* “Modern Roundabout” is the term used to differentiate modern roundabout design from the nonconforming traffic circles or rotaries that have been in use for many years. Modern roundabouts are designed according to AASHTO Geometric Design of Highways and Streets operational and design principle guidelines.

*“T” Intersection.* A three-leg intersection in the general form of a “T”.

*Three-Leg Intersection.* An intersection with three legs, where two highways join.

*Unchannelized Intersection.* An at-grade intersection without islands for directing traffic into definite paths.

*“Y” Intersection.* A three-leg intersection in the general form of a “Y”.

Railroad Crossing Angle. The angle of 90 degrees or less where a railroad and a highway intersect.

Railroad Grade Crossing. The general area where a highway and a railroad cross at the same level, within which are included the railroad, roadway, and roadside facilities for traffic traversing that area.

Skew Angle. The complement of the acute angle between two centerlines which cross.

Weaving Section. A length of one-way roadway at one end of which two one-way roadways merge and at the other end of which they separate.

## **2.10. Pavement – Flexible.**

Binder Course. A plant mix of graded aggregate (generally open graded) and bituminous material which constitutes the lower layer of the surface course.

Bituminous Coating.

*Prime Coat.* An application of a low viscosity liquid bituminous material to coat and bind mineral particles preparatory to placing a base or surface course.

*Seal Coat.* A thin treatment consisting of bituminous material, usually with cover aggregate, applied to a surface course. The term includes but is not limited to sand-seal, chip seal, slurry seal, contrast seal and fog seal.

*Contrast Seal.* A seal coat designed primarily to provide color or texture contrast with an adjacent surface.

*Fog Seal.* A thin application of bituminous material without cover aggregate.

*Slurry Seal.* A seal coat consisting of a semi-fluid mixture of asphaltic emulsion and fine aggregate.

*Tack Coat.* An application of bituminous material to an existing surface to provide bond with a superimposed course.

*Bituminous Concrete.* A designed combination of dense graded mineral aggregate filler and bituminous cement mixed in a central plant, laid and compacted while hot. Also referred to as Asphaltic Concrete Pavement, or ACP.

*Bituminous Surface Treatment (BST).* A bituminous road surface which can be constructed on compacted subgrade or base course by spreading a graded aggregate mixture and then coating with bituminous cement and compacting. Two applications (double BST) are frequently used to provide a minimum structural layer for low volume roads.

*Flexible Pavement.* A designed pavement structure, usually multilayered, which maintains intimate contact with and distributes loads to the subgrade and depends upon aggregate interlock, particle friction, and cohesion for stability and strength.

*Leveling Course.* The layer of material placed on an existing surface to eliminate irregularities prior to placing an overlaying course.

*Macadam.* A layer of coarse, graded angular mineral aggregate with a filler of fine aggregate, interlocked by compaction.

*Bituminous Macadam.* A macadam bound with bituminous material.

*Micro-surfacing.* A designed mixture of well graded sand, mineral filler and asphaltic cement processed in a central plant, laid and compacted while hot.

*Reprocessing.* The renewal of an existing surface by scarifying, remixing with or without additional material, and relaying. Also referred to as Recycling.

*Sand Asphalt.* A mixture of sand and asphalt, either plant mixed or road mixed.

Surface Treatment. One or more applications of bituminous material and cover aggregate or thin plant mix on an old pavement or any element of a new pavement structure.

Surfacing.

*Plant Mixed Surfacing.* A designed combination of mineral aggregate and bituminous material mixed in a central plant.

*Road Mixed Surfacing.* A designed combination of material components of a flexible pavement mixed on the roadbed or in a traveling plant.

**2.11. Pavement – General.**

Aggregate.

*Dense Graded Aggregate.* A well-graded aggregate so proportioned as to contain a relatively small percentage of voids.

*Open Graded Aggregate.* A well-graded aggregate containing little or no fines, with a relatively large percentage of voids.

*Skip Graded Aggregate.* Aggregate possessing disproportionate distribution of successive particle sizes.

*Well Graded Aggregate.* An aggregate possessing proportionate distribution of successive particle sizes.

Axle Load. The total load transmitted by all wheels the centers of which may be included between two parallel transverse vertical planes 40 inches apart, extending across the full width of the vehicle.

*Tandem Axle Load.* The total load transmitted by two or more consecutive axles the centers of which may be included between parallel transverse vertical planes spaced more than 40 inches and not more than 96 inches apart, extending across the full width of the vehicle.

Crack. A fissure or open seam not necessarily extending through the body of a material.

*Reflection Crack.* A crack appearing in a resurface or overlay caused by movement at joints or cracks in underlying base or surface.

Pavement Structure. The combination of subbase, base course, and surface course placed on a subgrade to support the traffic load and distribute it to the roadbed.

*Base Course.* The layer or layers of specified or selected material of designed thickness placed on a subbase or a subgrade to support a surface course.

*Subbase.* The layer or layers of specified or selected materials of designed thickness placed on a subgrade to support a base course.

*Subgrade.* The top surface of a roadbed upon which the pavement structure and shoulders including curbs are constructed.

*Subgrade Treatment.* Modification of roadbed material by stabilization.

*Surface Course.* One or more layers of a pavement structure designed to accommodate the traffic load, the top layer of which resists skidding, traffic abrasion, and the disintegrating effects of climate. The top layer sometimes called “Wearing Course”.

Recondition. To put an unpaved surface in good condition, usually without the addition of material, by scarifying, shaping, and compacting the existing surfacing material.

Resurfacing. The placing of one or more new courses on an existing surface.

Roadbed. The graded portion of a highway within top and side slopes, prepared as a foundation for the pavement structure and shoulder.

Surface Condition.

*Spalling.* A condition in which the surface of a concrete pavement chips off and the aggregate beneath is exposed.

*Washboarding.* A condition in which the surface of a dirt road is very rough with transverse corrugations due to a loss of fine aggregate resulting from high speed traffic.

*Roadbed Material.* The material below the surfacing in cuts and embankments and in embankment foundations extending to such depth as affects the support of the pavement structure.

Rumble Surface. A rough textured surface constructed for the purpose of causing the tires of a motor vehicle driven over it to vibrate audibly as a warning to drivers.

Stabilization. Modification of soils or aggregates by incorporating materials that will increase load bearing capacity, firmness, and resistance to weathering or displacement.



## 2.12. Traffic.

Capacity. The maximum number of vehicles which has a reasonable expectation of passing over a given section of a lane or a roadway in one direction, or in both directions for a two-lane or a three-lane highway, during a given time period under prevailing roadway and traffic conditions. Note: Synonymous with “Possible Capacity” as used in current AASHTO guidelines.

Design Capacity. The maximum number of vehicles that can pass over a lane or a roadway during one hour without operating conditions falling below a pre-selected design level.

Speed. The rate of vehicular movement, generally expressed in miles per hour.

*Average Overall Traffic Speed.* For all traffic count, or component thereof, the summation of distance divided by the summation of overall travel times.

*Average Running Speed.* For all traffic, or component thereof, the summation of distances divided by the summation of running times.

*Average Spot Speed.* The arithmetic mean of the speeds of all traffic, or component thereof, at a specified point.

*Design Speed.* A speed determined for design and correlation of the physical features of a highway that influence vehicle operation. It is the maximum safe speed that can be maintained over a specified section of highway when conditions are so favorable that the design features of the highway govern.

*Overall Travel Speed.* The speed over a specified section of highway, being the distance divided by overall travel time.

Traffic Control Device. A sign, signal, marking or other device placed on or adjacent to a street or highway by authority of a public body or official having jurisdiction to regulate, warn, or guide traffic. Each device should meet the standards of the most current edition of MUTCD.

*Traffic Control Signal.* Any device whether manually, electrically, or mechanically operated by which traffic is alternately directed to stop and permitted to proceed.

*Traffic Markings.* All lines, patterns, words, colors, or other devices, except signs, set into the surface of, applied upon, or attached to the pavement or curbing or to objects within or adjacent to the roadway, officially placed for the purpose of regulating, warning, or guiding traffic.

*Traffic Sign.* A device mounted on a fixed or portable support whereby a specific message is conveyed by means of words or symbols, officially erected for the purpose of regulating warning, or guiding traffic.

*Traffic Signal.* A power-oriented traffic control device by which traffic is regulated, warned, or alternately directed to take specific actions.

Vehicle.

*Bus.* A motor vehicle designed for the transportation of more than 10 persons.

*Design Vehicle.* A selected motor vehicle, the weight, dimensions, and operating characteristics of which are used in highway design.

*House Trailer.* A trailer or semi-trailer which is designed, constructed and equipped as a dwelling place, living abode or sleeping place, either permanently or temporarily, and is equipped for use as a conveyance on streets and highways.

*Light Delivery Truck.* A single unit truck, such as a panel or pickup truck, with size and operating characteristics similar to those of a passenger car and commonly used for short-haul light delivery service. For capacity analysis purposes it is considered to be a passenger car.

*Oversize Vehicle.* A vehicle which is over the legal height, length, width, or load limit and which requires a permit to use a road. Violation of vehicle size and load limits is a law enforcement issue.

*Parked Vehicle.* A vehicle stopped for temporary storage.

*Passenger Car.* A motor vehicle, except motorcycles, designed for carrying 10 passengers or less and used for the transportation of persons.

*Semi-trailer.* A vehicle with or without motive power; designed for carrying persons or property and for being drawn by a motor vehicle; so constructed that some part of its weight and that of its load rests upon or is carried by another vehicle.

*Standing Vehicle.* A vehicle stopped for a brief interval as when loading or unloading.

*Trailer.* A vehicle designed for carrying persons or property and drawn by a motor vehicle which carries no part of the weight and load of the trailer.

*Truck Tractor.* A motor vehicle designed for drawing other vehicles but not for a load other than a part of the weight of the vehicle and load drawn.

Volume. The number of vehicles or pedestrians passing a given point during a specified period of time.

*Average Daily Traffic.* The average 24-hour volume, being the total volume during a stated period divided by the number of days in that period. Unless otherwise stated, the period is a year. The term is commonly abbreviated as ADT.

*Design Volume.* A volume determined for use in design, representing traffic expected to use the highway. Unless otherwise stated, it is an hourly volume.

*Thirtieth Highest Hourly Volume.* The hourly volume that is exceeded by 29 hourly volumes during a designated year. (Corresponding definitions apply to any other ordinal highest hourly volume, as tenth, twentieth, etc.).

### **3. BUDGET**

- 3.1. Annual Budgeting.** Road maintenance operations should be performed within the annual budget allocation. Planning and scheduling of activities and purchases is necessary. It is recommended to program expenditures into the annual budget for anticipated weather caused road maintenance activities. This includes annual snow and ice control, monsoon rains, etc. The amount to be programmed should be equal to the average of the past five years' expenditures on these activities. Expenditures for these activities should be closely monitored in order that underages and overages can be properly handled.
- 3.2. Weekly Expenditure Monitoring.** All expenditures should be monitored and recorded with the appropriate activity code at least weekly in the beginning of the fiscal year in order to have direct and current knowledge of the status of the road maintenance budget. Expenditures include all payrolls, requisitions, charge card purchases, travel, training, GSA vehicle expenses, contracts and modifications.
- 3.3. Daily Expenditure Monitoring.** Expenditures should be monitored daily when the budget has been expended by 90%. In order to remain within budgetary constraints, expenditures should be programmed and monitored. This is accomplished through several reporting processes as follows:
- 3.3.1. Budget Status Report (monthly)
  - 3.3.2. Financial Program Plan
  - 3.3.3. Annual Acquisition Plan
- 3.4. Procurement cut-off dates.**
- 3.4.1. Generally the second week in June for contract actions and reimbursable agreements exceeding \$25,000, and all A&E services (except for task orders for an existing indefinite quantity/delivery), regardless of cost.
  - 3.4.2. Generally the third week in June for contract actions and reimbursable agreements less than \$25,000 requiring prior approval.
  - 3.4.3. Generally the first week in August for information technology procurements in excess of \$2,500.
  - 3.4.4. Generally the third week in August for contract actions less than \$10,000 (construction less than \$2,000 or services less than \$2,500) that do not require prior approval.
  - 3.4.5. The fourth week of August for credit card purchases.
  - 3.4.6. The fourth week of August for all actions under \$25,000 for request to purchase through Federal Supply Schedule under GSA.

## **4. DRAINAGE**

- 4.1. Introduction.** It is a maintenance responsibility to maintain and restore existing drainage structures, to keep water courses clear of debris and free flowing, to repair/replace erosion control measures and curb and gutter structures.
- 4.1.1. If new or additional structures are needed, a drainage analysis and structure design should be performed by competent individuals in accordance with standard design practices prior to installation.
  - 4.1.2. Any activity which may result in any discharge (point source or non-point source; pollutant or backfill) into the waters of the United States is subject to regulation under the Clean Water Act. Additionally, when applicable, Tribal Code should be complied with.
  - 4.1.3. All required environmental and archeological documentation should be in place prior to constructing any drainage structure or device.
  - 4.1.4. Maintenance activities should be confined to granted, or implied, BIA rights-of-way, with approval from other jurisdictions as appropriate.
  - 4.1.5. Because all BIA roads are public roads, all drainage structures installed should be traversable by the average passenger vehicle traveling at a speed that is normal for the type and condition of road. Warning signs should be posted and visible when a drainage structure is not traversable by the average passenger vehicle under those conditions. All signs should conform to the “Manual of Uniform Traffic Devices” (MUTCD) current edition.
- 4.2. Design.** Lack of adequate drainage design can result in drainage structure failure and/or washouts. Such failures can affect surrounding property and create hazardous conditions. The use of adequate drainage and proper and timely maintenance should ensure a stable road.
- 4.3. Types of Drainage.** Drainage may be either surface (run off, snow melt, live streams) or sub-surface (springs, seeps).
- 4.3.1. Surface Drainage. Surface drainage intercepts and removes water from the surface of roads and slope areas. Surface water can disrupt traffic, and cause erosion and roadway failure.
    - 4.3.1.1. *Ditches.* Grade ditches to drain (1% minimum is recommended) and provide positive drainage to avoid siltation. The following lists the usual types of ditches and describes their use:

- 4.3.1.1.1 Drainage Ditches. Ditches drain the roadbed by collecting and transporting water that leaves the road surface or cut slope to the nearest ditch relief culvert or outlet ditch. Ditches are constructed between the traveled way and the adjacent terrain. These ditches will be open unless they cross under a side road, a driveway, or a walkway. Roadside ditches should be maintained as near as practical to the alignment, grade profile, depth, and cross section to which they were originally designed and constructed or as subsequently reconstructed. At periodic intervals, the roadside ditches should be inspected for and cleaned of fallen rock, heavy vegetation, sediment creating ponding, and other debris that may restrict design drainage flows. Care should be taken while removing obstructions to avoid unnecessary damage to the existing vegetation that stabilizes the ditches and slopes.

Restrictive recycling programs in urban areas may promote uncontrolled dumping in outlying rural areas and, as such,, the roadside ditches need to be patrolled for dumping of yard waste and other trash items. Ditches with debris that may impede proper water flow or represent a hazard to errant vehicles should be cleaned as soon as it is practical to do so. Handwork will be necessary to remove litter and debris.

The use of heavy equipment to clean ditches of litter and debris unnecessarily disturbs functional drainage. If any debris is encountered that is suspected of containing hazardous or toxic materials, do not attempt to clear the debris until a properly qualified person has made an environmental safety determination. Care should be taken to properly dispose of any hazardous or toxic material.

- 4.3.1.1.2 Trap Ditches. Construct trap ditches to catch and hold slough and snow. Because it is a form of drainage ditch, trap ditches can perform all the functions of drainage ditches.
- 4.3.1.1.3 Intercepting Ditches. Where necessary, use intercepting ditches to protect the roadbed and roadway cut and fill slopes. On the cut side, locate such ditches above the catch point of the cut slope

to intercept runoff and channel it away. On the fill side, these ditches intercept water traveling along the fill and prevent erosion of the toe of the fill. The location of these ditches should be along the toe of fills where the ground is fairly flat and where cut slopes daylight into fill slopes. This prevents water from leaving outlet ditches and traveling directly against the fill slope. These drainage features intercept the natural overland flow of water and carry it to adjacent fields, detention basins, or less disruptive ditches or channel entrances. Check for silt deposits or erosion of such ditch cross-sections and profiles. Correct conditions that could cause ponding in these ditches, because this may contribute to slope instability. Avoid unnecessarily breaking the sod surface of a grassed interceptor in maintaining the cross-section or provide treatments to minimize any erosion of these ditches until the grass can regenerate (eg silt fences, biodegradable mats, etc.).

- 4.3.1.1.4 Furrow/Outlet Ditches. These ditches carry water away from the road to prevent the road subgrade from being saturated or eroded. These ditches are normally used in fairly flat ground when the topography does not allow the water to run away from the road. Locate these ditches at the lower end of a culvert or drain dip, or at the point where a roadside ditch daylights out onto natural ground.
- 4.3.1.1.5 Inspection and Maintenance of Ditches: Inspect ditches to assure that they are free flowing, without obstacles in the flow line which back up water or which running water should divert around.

Maintain ditches by grading and shaping the slopes and ditch line to drain. Maintain the proper ditch bottoms (v-ditches, flat bottom). Do not disturb ditches that have vegetation and are functioning. When necessary, remove obstacles before grading and shaping to drain.

#### 4.3.1.2. *Dips/Outslope Drains.*

- 4.3.1.2.1. Drainage Dips. Drainage dips intercept and remove surface water from the traveled way and shoulders before the combination of water volume and

velocity begins to cause erosion. Drainage dips are not the same as water bars. Water bars are normally deeper and are primarily for drainage and erosion protection on roads no longer in service.

Drainage dips are useful for native surfaced low-volume, low-speed roads which are not normally utilized by emergency vehicles or school buses. Drainage dips should only be used when other drainage structures are not practical. They should preferably be used in the short term, such as while awaiting a proper drainage structure installation. Drainage dips should be posted with cautionary signs warning the traveling public. When properly constructed, drainage dips can provide a relatively maintenance-free drainage structure in the short term.

The initial construction costs of a drainage dip may be cheaper than purchasing and installing culvert pipes, constructing roadside drainage ditches, and maintaining the culverts and ditches. However, unless the dips are properly designed and constructed, the total cost, including maintenance, may be more than if culvert pipes had been installed. The disadvantages of dips are low travel speeds, poor riding comfort, difficult grading of the traveled way, and possible adverse affects on water quality.

Road maintenance costs may increase when grading operations are discontinued. Avoid constructing drainage dips on road grades greater than 10 percent because of increased vehicle operation difficulties, added erosion, and resultant maintenance problems. On road grades in excess of 10 percent, consider other surface drainage structures, such as open-top drains.

Dips should discharge runoff in small amounts before runoff can significantly accumulate. Dips skewed from the perpendicular to the road centerline may drain and self-maintain better than dips that are not skewed. However, an unskewed dip normally results in better driving characteristics. The downstream barrier of the dip should not create



a "hump" in the grade. Taper the downhill slope to blend with the road gradient.

It may be desirable to place spot gravel to stabilize the crest and trough portions of the dip to reduce erosion and to maintain stability.

- 4.3.1.2.2. Inspection and Maintenance of Drainage Dips: Inspect drainage dips to assure that they are functioning properly and are not too steep or sharp for traffic to traverse. Inspect cautionary signs to assure that they are in good condition and in compliance with MUTCD.

Maintain drainage dips by grading and shaping the roadway to conform to design drawings.

- 4.3.1.3. *Naturally occurring low water crossings.*

- 4.3.1.3.1. This type of crossing exists in a road due to water crossing the road at a low spot in the road profile. There are no drainage structures installed. This type of crossing is generally utilized in intermittent water courses that are dry for a portion of the year. Placing spot gravel in the low point of the crossing often helps stabilize the roadway, prevent erosion, and facilitate traffic. It is recommended that warning signs be posted on both approaches to the low water crossing advising the traveling public "DO NOT ENTER WHEN FLOODED". A delineator marked to illustrate the depth of flowing water also assists the public in making the determination whether to cross flowing water or not. This type of crossing is not recommended and carries substantial liability exposure.

- 4.3.1.3.2. Inspection and Maintenance of naturally occurring low water crossings: Inspect the crossing to assure that the water running across the road has not eroded the road to the extent that a typical passenger vehicle cannot traverse the site and that the water can flow smoothly across the road. There should be no berms or dikes impeding the flow. Inspect signs to assure they are in good condition and in compliance with MUTCD.

Maintain the crossing by grading and shaping the traveled way and shoulders to maintain water flow and vehicle traffic.

4.3.1.4. *Constructed low water crossings.*

4.3.1.4.1. A constructed low water crossing is one for which a drainage analysis has been performed and the allowable height of flowing water which a passenger vehicle can safely traverse has been determined. A low water crossing is then designed and constructed at a height where all flow up to the design storm either flows under it, through it, or is dammed behind the crossing, and flow at and over the design storm flows over the crossing to a predicted height that has been deemed safe for average passenger vehicles to traverse. Such low water crossings are typically constructed using one of three methods:

- Culverts may be installed in a roadway (under the road water) to allow a design amount of water to pass;
- Grates (i.e. cattle guard grate) may be used to ‘bridge’ the channel and thereby accommodate flow under it to a certain depth;
- Concrete barriers (i.e. jersey barriers) may be installed in a roadway downstream of the flow of water.

It is recommended that warning signs be posted on both approaches to the low water crossing advising the traveling public “DO NOT ENTER WHEN FLOODED”. A delineator marked to illustrate the depth of flowing water also assists the public in making the determination whether to cross flowing water or not. This type of crossing is not recommended for roads with high speed and/or high traffic volume, or that are routinely utilized by emergency vehicles and school buses. This type of crossing carries substantial liability exposure.

4.3.1.4.2. Inspection and Maintenance of Constructed Low Water Crossings: Inspect the crossing by carefully comparing the final approved As-Built with the installed structure to assure that all required

components are in place and functioning, that the field elevations agree with design elevations. Inspect signs to assure that they are clean and in good repair, are legible, and have adequate reflectivity.

Maintain the crossing by cleaning culverts to keep them free flowing; cleaning grates and recompacting supports, reshaping roadway and approaches, restoring elevations to design elevations.

#### 4.3.1.5. *Corrugated Metal Pipe Culverts/Corrugated Steel Pipe.*

- 4.3.1.5.1. Corrugated Metal Pipe Culverts/Corrugated Steel Pipe (CMP/CSP) are culvert pipes that are installed in a roadway to channel water flow under the road. Flow is not intended to overtop the road. CMP/CSP structures are designed to accommodate a specified amount of estimated flow. They should be installed in accordance with construction standards to assure an efficient, economic, safe and long lasting installation. Culverts may not be installed below the natural flow line unless a 'drop inlet' structure is utilized; 'buried culverts' are not allowed.

Culverts may be used for ditch relief to carry water to the opposite side of the road where the flow can disperse away from the roadway. Culverts may be installed in live or intermittent streams or washes to carry the water flow under the road.

The spacing of ditch relief culverts depends on the road gradient, road surface and ditch soil types, runoff characteristics, and the effect of water concentrations on slopes below the road. Ditch relief culverts installed in roads with steep grades, particularly in steep mountainous terrain with high intensity storms, have an increased potential for failure. Failure may result in increased ditch scour, extensive erosion of road surfacing, and mass failure of roadway fills. Debris blockage causing culvert failure can lead to a domino effect. When one culvert fails, debris and water flow to the next culvert and may result in its failure, and so on.

Drainage failures may also have a detrimental effect on land below the road. Siltation in streams and degradation of water quality may be increased and aquatic habitat may be damaged. Runoff concentration increases surface erosion, mass soil movement, and stream channel scour.

Skewing ditch relief culverts from a line perpendicular to the centerline of the road may improve flow characteristics, reduce siltation problems, and reduce the possibility of debris plugging the culvert inlet. When determining the degree of skew, consider the following factors: (a) the additional cost caused by the additional culvert length, (b) proper dispersal of water below the road, and (c) improved flow characteristics through the pipe. Do not use skewing when water is flowing toward the culvert inlet from both directions, except to reach or fit a natural channel.

Culverts installed to carry water in live or intermittent streams should have a drainage analysis and design performed before installation.

Ensuring proper cover lessens the chance of damage to the culvert barrel and inlet end.

To minimize damage, provide adequate cover for the design life of the culvert. This requires anticipating the amount of material that may be lost due to road use and erosion.

The installation of the culvert at the inlet should include any structure necessary to prevent erosion of the road bed and backslope. Construct backslopes at a stable slope to minimize the possibility of culvert plugging from ravel or slumping. Where practical, provide a transition taper between the normal backslope and the inlet backslope. Inlet structures may consist of hand-laid rock headwalls, ditch dams, inlet basin liners, drop inlets, or other special structures designed for specific conditions at the site.

It is also possible to use culverts placed in natural drainages for ditch relief; however, consider the

effect of possible sedimentation or increased flows on the natural drainage.

4.3.1.5.2. Concrete Box Culverts (CBC's) are generally installed in live or intermittent streams. They require a drainage analysis and design. Common culvert types include reinforced concrete box culverts (RCBC), concrete pipe, corrugated metal pipe, timber, or small-diameter plastic pipe. These culvert types have some common maintenance requirements to ensure an efficient, effective roadway drainage system.

- Culverts need to be kept clean and unobstructed by removing sediment, debris buildup, and any brush or woody vegetation growing at either the inlet or outlet.
- In rural areas, cable, phone, power companies like to run their lines through culverts too. This practice should be noted and prevented, or remedied when found.
- The inlet or outlet flow channel alignment may have to be adjusted to prevent sedimentation from returning.
- Footing, headwalls, and cutoff walls need to be inspected for scour at culvert ends.
- Brush and debris may need to be removed upstream of the culvert to prevent or limit future storms from clogging the culvert.
- If a culvert has been broken, pushed out of alignment, settled, heaved, or suffered major damage, it should be scheduled for repair or replacement as soon as it is practical to do so.
- Worn or corroded inverts of pipe culvert can be repaired with concrete grout, gunite, or asphaltic material as an invert line to extend the life of the culvert.
- For smaller pipe culverts in which the original design provided sufficient excess drainage capacity, a smaller diameter pipe can be inserted into the existing culvert and grout can be pumped in-between the two pipes to seal the repair.
- Severe scour problems may require installing piles of large stone to dissipate the water energy upstream of the culvert.

- Minor cracks and joint separations in a culvert can often be sealed with high-pressure grout.

#### 4.3.1.5.3. Inspection and Maintenance of Concrete Box Culverts (CBC's).

CMP/CSP's should be inspected at least quarterly in accordance with the "Deferred Road Maintenance Assessment Report" guidelines to ensure the following:

- Culverts are clean and free flowing;
- Inlets and outlets are clean;
- Erosion control structures are functioning and stable;
- Fill slopes and backslopes are not eroding
- Roadways are graded and shaped over the installations;
- Ends are not crushed;
- Culvert is not corroded.

CBC's should be inspected to ensure the following:

- They are clean and free flowing;
- The concrete is in good repair without spalling or gouges;
- The reinforcing steel is not visible;
- Erosion control at the inlet and outlet is in good repair;
- The slope and channel at the inlet and outlet are not eroded;
- The channel is still aligned with the inlet.

Maintain the CBC by:

- Cleaning it out and removing all debris;
- Patching and replacing the concrete as necessary;
- Treating exposed steel;
- Restoring erosion control to original design and condition;
- Repairing any erosion;
- Cleaning, shaping and re-aligning the channel as necessary.

#### 4.3.1.6. *Settling Basins*. Settling Basins are generally constructed to capture flow at the outlet in a designated area and detain it for a specified period of time until the sediment settles out.

Drainage analysis and structure design are required for these. Settling Basins can be constructed of:

- Concrete;
- Mortared riprap;
- Wire encased riprap.

Unprotected earth settling basins are not recommended due to the potential for erosion.

#### 4.3.1.6.1. Inspection and Maintenance of Settling Basins:

Inspect the settling basin to assure that:

- It is clean and not filled with sediment;
- It is stable;
- Erosion is not occurring;
- It is functioning as planned.

Maintain the settling basin by cleaning the sediment out, and repairing any erosion or apparent structural failures.

4.3.1.7. *Catch Basins and Drop Inlets.* Drop inlets collect water from gutters and drainage ways that flow into storm sewers and other drain pipes. They act as connection units when the design requires a change in pipe size, the combining of several pipe flows into one, or a change in flow line grade. As a result of the energy changes in the water flow at these structures, sediment load may be dropped in the basin, requiring periodic (perhaps annual) inspection of the basin to determine if the sediment needs to be cleaned or flushed out. It is also important that the basin, inlet opening, or grate not be blocked by any debris to retain the hydraulic efficiency of the opening. Maintenance patrols after storms should be alert for and remove trash or debris lodged in inlet openings or basin openings. Bridge catch basins should be inspected at the end of the winter snow and ice control season if abrasive material was used on the bridges.

4.3.1.8. *Curb and Gutter.* Curb and gutter are constructed on paved roads in urban areas to channel water at the edges of the pavement. Curb and gutter drainage structures consist of a number of components: drop inlet, concrete swale/valley gutter, rundown, and scupper. The water will run in the gutter until it reaches a place, such as a drain, where it can disperse.

Curbs and gutters that direct or control the overland flow of water to ditches or inlets should be monitored for debris accumulation (sediment or trash) after storms. In areas where sand or other fine material is used in winter snow and ice operations, these areas should be inspected for debris

accumulation shortly after the end of the snow and ice season. Curbs that have been damaged or broken due to snowplowing need to be repaired as soon as it is practical to do so. In moderate climates, curbs and gutters need to be observed for failure as a result of settling or subsiding material in back of or underneath the curb and gutter section. Any breaks in a curb and gutter line attributable to settling need to be repaired as soon as it is practical to do so.

4.3.1.8.1. Inspection and Maintenance of Curb and Gutter: Inspect curb and gutter to assure that they are in good repair and water can flow freely in the gutter to the point of dispersal. Maintain curb and gutter by cleaning and by patching the material.

4.3.2. Subsurface Drainage. Subsurface drainage intercepts and removes groundwater that flows into the base course and subgrade, lowers high water tables, and drains water pockets. Sub-surface drainage problems should be immediately referred to a qualified engineer for a remedial design.



## **5. ENVIRONMENTAL COMPLIANCE**

**5.1. Introduction.** Federal laws and regulations have been enacted to protect the environment. Some define and regulate the processes that should be completed prior to performing certain maintenance activities. Some regulate general maintenance operations with regards to clean air and water, as well as hazardous materials and wastes. As a federal agency, BIA is mandated to comply with all applicable laws and regulations. Failure to comply can result in legal action being taken against the offending Agency. Such actions can vary from simple censure or “Notices of Violation” being issued by the regulatory agency and punitive fines being levied against the offending Agency, to criminal and/or civil charges being brought against the offending party/Agency. In order to be in compliance, maintenance planning and field personnel should be familiar with applicable laws and regulations and potential restrictions on maintenance activities.

### **5.2. Authority.**

5.2.1 Statutes. The following statutes refer to environmental compliance. Statutes relating or applying to the IRR Program are covered in 82 IAM.

National Environmental Policy Act (NEPA) 42 USC §§4321-4370d.

Enacted in 1969, this act, as amended, declares national environmental policy and requires federal agencies to prepare an environmental impact statement before taking any major federal action affecting the quality of the environment.\* NEPA also covers environmental assessments (EA), Finding of No Significant Impact (FONSI) and Categorical Exclusion (CAT EX).

Endangered Species Act (ESA) – 16 USC §§1531-1544. Enacted in 1973, this act requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of any species listed as endangered or threatened; prohibits trade in such species; and makes it unlawful for anyone to take (harass, harm, kill, capture, or collect) an endangered animal species or remove or damage any endangered plants on federal land in knowing violation of state law. \*

National Historic Preservation Act (NHPA) – 16 USC 470 et seq.

Enacted in 1966 this act establishes a program for the preservation of historic properties throughout the nation. Section 106 requires Federal agencies to take into account the effects of their undertakings on historic properties and afford the Tribe a reasonable opportunity to comment on such undertakings.

*“Historic property”* means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in the National Register of Historic Places maintained by the

Secretary of the Interior. The term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian Tribe or Native Hawaiian organization and that meet the National Register criteria.

*“Undertaking”* means a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency, with Federal financial assistance; those requiring a Federal permit, license, or approval; and those subject to State or local regulation administered pursuant to a delegation or approval by a Federal agency.

Clean Air Act (CAA) – 42 USC §§74091-7671q. Enacted in 1970, this act establishes a national regulatory program to control air pollution through: (1) health based ambient air quality standards to be attained through state implementation plans; (2) technology based new source performance standards; (3) national emissions standards for hazardous air pollutants; (4) emissions standards for mobile sources and controls on fuel additives; (5) acid rain control program to reduce emissions of sulfur dioxide and nitrogen oxide through tradeable emissions allowances; (6) national permit program. Amended in 1977 to establish non-attainment program and codify program for prevention of significant deterioration of air quality. \*

Clean Water Act (CWA) – 33 USC §§1251-1387. Enacted in 1977, the Federal Water Pollution Control Act (FWPCA) was enacted in 1972 to establish a national regulatory program to control water pollution. The Clean Water Act amended FWPCA to revise compliance deadlines and to shift to technology based approach to controlling toxic water pollutants by: (1) prohibiting the un-permitted discharge of any pollutant from any point source to surface waters; (2) imposing multi-tiered, technology based effluent limitations on discharges that may be made more stringent when necessary to meet water quality standards that states are required to adopt; (3) requiring pre-treatment of discharges into sewers; (4) establishing a national permit program for elimination of pollutant discharges; (5) prohibiting the discharge of dredged or fill material into navigable waters without a permit. \* In 1987, the Water Quality Act added the requirements that EPA issue National Pollutant Discharge Elimination System Permits (NPDES) for several categories of stormwater discharge. Maintenance personnel should be aware of sections 401, 404, and 402 of the Clean Water Act before commencing activities.

Resource Conservation and Recovery Act (RCRA) – 42 USC §§6901-6992k. Enacted in 1976, this act establishes a regulatory program governing the generation, transportation, treatment, storage, and disposal of hazardous wastes. A hazardous waste is any ‘solid waste’ which exhibits a specific hazardous characteristic or is listed by regulation as hazardous.\*

Emergency Planning and Community Right to Know Act (EPCRA) 42 USC §§11001-11050. Enacted in 1986, this act requires facilities handling extremely hazardous substances to notify emergency planning committees who should prepare local emergency response plans; requires facilities to report annually to EPA and state authorities the quantities of toxic chemicals released into each environmental medium. This data is used by EPA to prepare an annual toxic release inventory accessible to the public.\*

CERCLA - (42 USC §§103) (Comprehensive Environmental Response, Compensation, and Liability Act). Enacted in 1980, and amended in 1986 (by Superfund Acts); this act created a tax on the chemical and petroleum industries and provided Federal authority to directly respond to the release or threatened release of hazardous substances that may endanger public health or the environment.

SDWA (Safe Drinking Water Act) - 42 USC s/s 300f et seq. Enacted in 1974, this act is intended to protect the quality of drinking water in the United States. The law focuses on all waters actually or potentially designated for drinking, whether derived from above or underground sources.

NAGPRA (Native American Graves Protection and Repatriation Act) - (43 CFR Part 10). Enacted in 1990, this act addresses the rights of lineal descendants, Indian Tribes, and Native Hawaiian organizations (parties with standing) to Native American human remains, funerary objects, sacred objects, objects of cultural patrimony, and cultural items. The statute requires Federal agencies and museums to provide information about Native American cultural items to parties with standing and, upon presentation of a valid claim, ensure the item(s) undergo disposition or repatriation.

MBTA (Migratory Bird Treaty Act) - 16 USC §§703-712. Enacted in 1918, this is the domestic law that affirms, or implements, the United States’ commitment to four international conventions with Canada, Japan, Mexico, and Russia for the protection of shared migratory bird resources. It governs the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts and nests. Many flying birds are

considered migratory; and cutting of a tree with a live nest in it during nesting season could be considered “taking” unless a depredation permit is acquired beforehand.

Bald Eagle Protection Act – 16 USC 668-668d, 54 Stat. 250. Enacted in 1940 and amended by Public Law (PL) 1959 (73 Stat. 143), 1962 (76 Stat. 1346), 1972 (86 Stat. 1064), 1978 (92 Stat. 3114). This act provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession and commerce of such birds. The 1978 amendment permits the taking of golden eagle nests that interfere with resource development operations (see MBTA and ESA). A 1994 Memorandum (59 FR 22953) describes the policy concerning collection and distribution of eagle feathers for Native American religious purposes.

Executive Order No. 12898 - 59 FR 7629. Enacted in 1994, this act requires that each Federal agency make the achievement of environmental justice (EJ) a part of its mission. Each agency is to accomplish this by identifying and addressing, as appropriate, disproportionately high adverse human health and environmental effects of its programs, policies, and activities on minority populations and low income populations. EJ concerns were made part of the NEPA process in August 1994.

American Antiquities Act – 16 USC 431-433. Enacted in 1906, this act requires that no person be allowed to appropriate, excavate, injure, or destroy any historic or prehistoric ruin or monument, or any object of antiquity, situated on lands owned or controlled by the Government of the United States, without the permission of the Secretary of the Department of the Government having jurisdiction over the lands on which said antiquities are situated under penalty of law.

TSCA- Toxic Substances Control Act - 15 USC s/s 2601 et seq. Enacted in 1976, this act gives the NEPA the ability to track the industrial chemicals currently produced or imported into the United States. TSCA supplements other Federal statutes, including the Clean Air Act (CAA) and the Toxic Release Inventory under EPCRA.

FIFRA (Federal Insecticide, Fungicide and Rodenticide Act) - 7 USC s/s 136 et seq. Enacted in 1996, this act provides federal control of pesticide distribution, sale, and use.

FOIA (Freedom of Information Act) - 5 USC 552. Enacted in 1966- Electronic Freedom of Information Act (E-FOIA)-amended in

1996, this act generally provides any person with statutory right, enforceable in court, to obtain federal agency records unless the records or a part of the records are protected from disclosure by any of the nine exemptions or by one of the three special law enforcement record exclusions.

OPA (Oil Pollution Act) - 33 USC 2701-2761. Enacted in 1990, this act amended the CWA and addressed the problems associated with preventing, responding to, and paying for oil pollution incidents in navigable waters of the United States.

PPA (Pollution Prevention Act) - 42 USC §6601 et seq. Enacted in 1990, this act focused industry, government, and public attention on reducing the amount of pollution through cost-effective changes in production, operation, and use of raw materials.

#### 5.2.2 Regulations.

NEPA – 40 CFR 1500 - 1508

ESA – 50 CFR 1 – 199  
50 CFR 402

NHPA – 36CFR Part 800

CAA – 40 CFR Part 86

CWA – 40 CFR 121 (401 requirements)  
33 CFR 336.1 (404 & 401 interface)  
33 CFR 320.3 (404 requirements for individual permits)  
33 CFR 330.4 (404 requirements for nationwide permits)  
40 CFR 122.26 (NPDES requirements)

RCRA – 40 CFR 260 - 279

EPCRA - 40 CFR 300, Subchapter J

5.2.3 Other Applicable Laws and Regulations. There are other environmental laws which could be applicable to maintenance operations. Additionally, Occupational Safety and Health Administration (OSHA) and Department of Transportation (DOT) have laws and regulations which coincide with and supplement the environmental regulations dealing with hazardous materials and wastes. DOT 4(f) is applicable to any Title 23 highway funds, regarding taking of or impact to historic resources, public use areas such as parks, campgrounds, etc. BIA should comply with these when applicable.

*\* Robert V Percival, Little, Brown and Company*

## **6. EROSION CONTROL**

**6.1. Erosion Control.** Erosion control is largely a design concern; however, unforeseeable developments resulting in damage to the roadway can shift the responsibility to maintenance. In many instances, erosion should be controlled through maintenance planning and budgeting. All required environmental and archeological documentation should be in place prior to constructing or installing erosion control.

**6.2. Surface Erosion Repair.** To repair surface erosion caused by water:

6.2.1. Determine the extent and cause of existing drainage problems and;

6.2.1.1. Repair or clean ditches, culverts and pipes that serve the area.

6.2.1.2. Provide drainage for excess accumulations or flows of water with pipes or ditches.

6.2.2. Repair surface damage by either reshaping or backfilling. Fill materials should be adequately compacted. Established soils should be disturbed as little as possible. Temporary drainage ditches may be necessary until a vegetative cover can be established.

6.2.3. Lightly cultivate the soil and seed with quick germinating grasses or legumes. Apply mulch as necessary to protect seeding. Sprigging and sodding may be appropriate under some conditions.

6.2.4. Mulching will help reduce further erosion before vegetation provides protection. It also retains moisture for growth and reduces the loss of seeds and fertilizers.

Recommended mulching materials include large fiber materials (e.g., excelsior matting, hay or straw, dried grass cuttings, fiberglass filaments, and jute matting); granular materials (e.g., sawdust, ground bark, wood chips, ground corn cobs; and asphalt emulsions [1:5 dilutions, sprinkled on loose mulch materials at a rate of 200 gallons per acre, will help to hold mulch in place]).

Availability of materials at low cost will influence the types of mulches used. Quantities to be used should not interfere with growth of seeding.

**6.3. Use of Chemicals.** In some instances, erosion may be traced to a loss of vegetation caused by chemicals used for ice and snow removal. Plantings with a high resistance to chlorides are recommended if a reduction in the use of chemicals for snow removal or better drainage cannot be arranged. Verify proposed seed mix with BIA Division of Natural Resources and Tribal entities.

- 6.4. Use of Fertilizers.** Proper fertilizers and methods of application will vary with locations and the season. Verify proposed fertilizer and application with BIA Division of Natural Resources and Tribal entities.
- 6.5. Steep Slope Seeding.** Slopes that are too steep to cultivate or retain mulch may require regrading, provided their condition threatens to damage the roadway. Biodegradable fiber mesh netting may prove to be more economical on steep slopes to hold mulch.
- 6.6. New Slope Seeding.** Prevention of erosion on newly graded slopes should largely be based on knowledge of the conditions of the area. Factors that will influence erosion:
- 6.6.1 Types of soil. Loose soils are more susceptible to water and wind damage but generally are more conducive to growth of vegetation. Hard soils containing rocks or clay when compacted can resist considerable wind and water but require special effort to persuade vegetation to grow.
  - 6.6.2 Weather conditions. Intensity of rain and effects of dry windy weather should be anticipated and suitable ground cover must be provided.
- 6.7. Subsurface Drainage.** Subsurface drainage can be the cause of major erosion problems. Stabilization of subsurface areas can best be achieved with a good drainage design by a qualified engineer.
- 6.8. Proper Plantings.** Proper plantings will in time provide a better bonding of topsoil layers to the subsurface base.
- 6.9. Chronic Erosion.** Chronic erosion of ditches or waterways should be corrected by riprapping or by the installation of jute matting, sodding, or other combinations as required.
- 6.10. Wind Erosion.** Wind erosion and drifting sands can be controlled by covering them with stable granular or earthen materials; spraying with EPA approved erosion control solutions; applying top soil and seeding in areas where rainfall will support grass growth; or constructing drift fences.
- 6.11. Inspection Scheduling.** Walls, cribbing and concrete structures should be inspected at least every quarter in accordance with the deferred maintenance assessment reporting requirements.
- 6.12. Inspection and Repair of Concrete Structures.** Concrete structures should be checked for cracks or movement. Surface spalls should be repaired by using a non-shrink mortar or an appropriate epoxy grout. Weep holes in walls should be inspected annually prior to the winter season. These weep holes must be kept clean and open. Erosion at the base of walls and cribs should be controlled by any means necessary.

- 6.13. Inspection and Repair of Timber Structures.** Timber cribbing and walls should be inspected quarterly for signs of failure and repairs should be made as conditions warrant. They should be kept free of weeds, brush, and small trees.
- 6.14. Establishment of Ground Cover.** Establishment of adequate sod on the roadside is a major maintenance concern. Considerable research has been done to identify the factors that influence the success of various plantings to create a good sod and protect the soil from erosion.

There are many varieties of grasses and ground cover plants. From this number there are usually a few that, with proper encouragement, can provide protection for almost any condition. Use best management practices for planting operations. Select the native seeds or plants that best suit the conditions and climate.

Sodding may be the most practical and economical method in many instances, particularly on steep slopes when turf is to receive immediate foot traffic. It also provides the optimum repair for an existing high quality turf. Factors that should be evaluated before planting:

- 6.14.1. Condition of surface soil. Moisture may range from arid to swampy; composition may range from sand and loam to clay and rocks; fertility will be influenced largely by the soil's composition, previous use, and whether it has established horizons.
  - 6.14.2. Exposure to sun, shade, wind, rains, ice, snow and range of seasonal climate changes.
  - 6.14.3. Degree of slope.
  - 6.14.4. Availability of drainage, irrigation.
  - 6.14.5. Time of planting.
  - 6.14.6. Condition of subsurface and whether the root structure of the planting will be expected to prevent slides or slumping.
- 6.15. Earth Slides.** Earth slides present a serious problem in highway maintenance. In most cases, water causes an increase in weight and fluidity by infiltrating pervious material. Cracks open up, additional water enters the mass, and further movement follows.

Slides can be a serious traffic hazard when they block part of a roadway. As soon as there is evidence of earth movement in a potential slide, road maintenance personnel should notify a qualified engineer to initiate an investigation to determine the cause, extent and any potential remedial action. Preventive



measures may include the installation of interceptor ditches, underdrains or the complete removal and replacement of affected fill areas.

Slides should be properly marked with signs or barricaded as soon as discovered. In some instances flagmen may be required. Removal of slide material from a roadway should be accomplished as soon as possible. Safety precautions should include making a determination as to what will happen to the area above the slide when the material is removed.

- 6.16. Rockfall Ditches.** These ditches are located at the foot of steep rocky hillsides to collect loose rocks and prevent their reaching the roadway or damaging other parts of the roadway structure. Collected rocks should be removed whenever such ditches accumulate enough rock to impair the intended functions or to cause a safety hazard.
- 6.17. Proper Maintenance.** To reduce the possibility of erosion, all ditches, culverts, channels, and water courses should be maintained to function properly.
- 6.18. Proper Channelization.** Interceptor ditches, diversion ditches, and bench-cut slope channels intercept surface drainage on slopes, prevent erosion and divert water from reaching the roadway structure by channeling it into a disposition system such as a natural water course or roadside channel. They may spread water onto fields or carry it to dry wells or retention basins. If excessive silt may be present from large runoffs, the runoff flow may be channeled to diked-in areas or sediment basins before the water is directed to a natural water course or a roadside channel. Grass lined interceptor ditches should be kept reasonably clear of weeds and obstructed materials that are not part of its intended configuration. When cleaning, care should be taken not to damage the grass cover. Obstructions in interceptor ditches could cause water to pond above slopes and contribute to potential slide conditions.
- 6.19. Cleaning of Culverts.** Culverts should be kept clean and unobstructed. Obstructions and sediment deposits should be removed promptly. During severe storms and floods, critical areas should be patrolled, debris should be removed, and inlets cleared. Culverts cannot function to capacity if inlet and outlet channels are not properly aligned and maintained. Often the inlet channel needs realignment to prevent sediment deposition. Footings, cutoff walls and headwalls should be inspected for scour around culvert ends.

Areas around culvert inlets should be controlled to limit vegetation and permit free flow of water. In areas subject to cloudbursts and heavy rainfall, channels and culverts often fill completely.

- 6.20. Roadside Channels.** Roadside channels and roadside ditches are separate from the roadway and constructed parallel to it, they have sufficient depth, cross section and grade to handle the expected flow of water. They are open unless crossing under side roads or walkways. They may be lined with paving material,

loose or grouted rock or sod, or in a natural state, provided they are adequate for their purpose. Channels should be maintained to the line, grade, depth and cross section to which they were built or subsequently improved. They should be cleaned annually by removing rocks, dirt, debris, tall weeds, brush or leaves which may restrict the normal flow of water. Median swales should be maintained in their design configuration.

- 6.21. Channel Cleaning.** Material left on the shoulder when roadside channels are cleaned by graders is a hazard to traffic and should be removed each day. Channel cleanings should not be graded across any paved highway surfaces. Roadside channels should not be cut to a “V” section where practical and should only be deep enough to provide underdrainage for the roadbed and normal runoff. When channels are being graded, undercutting back slopes should be avoided as it encourages slope erosion. When natural vegetation is removed through ditch cleaning, reseeding should be considered. To stop excessive erosion in unlined channels, pit run gravel, talus, or quarry-run rock can be used to fill the eroded areas and to line the bottom of the channel. A succession of check dams can also be constructed across the channel to reduce the flow velocity. Use of these structures should be conditioned upon safety and proper design.

- 6.22. Natural Water Courses and Bank Protection.** Natural water courses are basic to the natural drainage of an area. They consist mainly of rivers, streams, gullies, arroyos, etc. They may have a continuous flow of water or only carry water occasionally. Natural water courses include flood or relief channels within the highway right-of-way.

They should be kept clean and free from rubbish, brush, and other debris. An adequate channel should be maintained. Bank scouring can be kept to a minimum by keeping the channel alignment straight whenever possible, protecting the banks with riprap or by other approved methods. All activities should comply with environmental requirements, particularly those of the U.S. Army Corps of Engineers.

Protection measures may be required where a stream flow or wave action endangers highway embankments or structures. Erosion may be controlled by rock or stone slope protection, grouted riprap, sacked concrete riprap, concrete slope paving, gunite slope paving, pile revetments, jetties, retards, jackstraws, tetrahedrons, retaining walls, and cribs. The type of protection should maintain the location and natural roughness of the bank. Optimum use of local materials is preferred.

- 6.23. Emergency Measures.** For emergency measures during a flood, contact the appropriate local authorities.
- 6.24. Planting.** Planting willows along an overflow bank may aid in controlling erosion by reducing the velocity of flow, but the possibility of the willows being scoured

out should be considered. Other plant species native to the area should be considered as alternative means of erosion control.

**6.25. Constructing Dikes.** Dikes may be constructed to direct water away from a fill or bridge abutment, but may cause erosion. Dikes or other obstructions which will result in abrupt changes in currents should be avoided.

**6.26. Bank Protection Measures.** The following are materials that may be used for bank protective measures against erosion:

6.26.1. Stone Riprap. Dumped stone riprap or broken concrete is flexible, easily repaired, and has the ability to resist heavy impact from drift and debris. The riprap should be extended into a trench, the base of which is below the depth of anticipated scour. Amount, size, and weight of the stone should be determined in accordance with the velocity of water, the depth of flow, embankment slope and buoyant forces of the water course. Stones should be reasonably well graded to avoid leaching of bank material through the interstices. Dumping of riprap under water usually requires double the quantity needed for an exposed bank.

Erosion repair of earth dams should be performed in consultation with a qualified engineer under a Memorandum of Agreement.

6.26.2. Rock and Galvanized Wire Mattresses. When rock of sufficient size cannot be economically obtained, properly anchored rock and wire mattresses may be used to protect against severe scour in small streams or at the base of concrete slope paving.

Mattresses should be constructed in sections to limit the extent of any failures. Steel angle iron stakes driven in the ground will help to anchor mattresses. These stakes should be five to six feet in length.

6.26.3. Grouted Riprap. Grouted riprap, grouted masonry, or grouted boulder slopes are rigid types of slope protection that may be very effective, but may be damaged by undercutting. Inspection should be made for possible undercutting after major streams. Galvanized wire may be used to increase the overall strength of grouted areas. Weep holes should be left to allow drainage and prevent buildup of hydrostatic pressure. Loss of material through weep holes can be prevented by a filter blanket. Grout should not be placed when temperatures are at near freezing.

6.26.4. Sacked Concrete Riprap. Sacked concrete riprap protection of embankments is easy to repair and is adaptable to any reasonable slope. Sacked concrete may be placed on 1:1 slopes when the embankment is stable. If the embankment is unstable or loosely compacted, or if there is a possibility of saturation, sacked concrete should not be used on slopes steeper than 1 ½:1. Class C concrete is generally used, with sacks about

two-thirds filled. This should yield approximately 3.5 bags per yard of concrete. Each succeeding row of sacks should overlap the joints of the last row.

The downstream end of an area protected by sacked concrete riprap should be anchored to a durable element of the natural bank. This should prevent loss by eddies which will develop at the transition from the smooth riprap to the rougher natural bank.

Steel angle stakes may be driven through the wet sacks into the ground to add extra stability. Inspections should be made for undercutting following high water stages. Large cracks should be filled with concrete grout to prevent loss of backing material.

On embankments with loosely compacted or granular materials, there is danger of progressive scour behind sacked concrete riprap. In such cases, repairs should be made in consultation with a qualified engineer.

6.26.5. Reinforced Concrete Slope Paving. Slope protection by reinforced concrete is subject to damage by undermining and should be carried to a point below possible scour. Excess undermining and installations should be inspected quarterly, in accordance with the deferred maintenance assessment reporting requirements, and cracks filled or patched as required.

6.26.6. Gunite Slope-Paving. Air blown mortar is used for slope paving or ditch and channel lining. Cracks should be filled with joint-filling material, or patched as required. Cracked surfaces should be patched with a mortar mixture.

6.26.7. Retaining Walls and Cribs. Retaining walls may be either plain or reinforced concrete, rubble, masonry, metal, concrete or timber cribs, or sacked concrete. Rubble or masonry walls should be inspected and repaired as necessary. Weep holes in walls should be kept open. Erosion at the base of walls should be prevented. Timber cribs or bulkheads should be kept free of weeds and fire hazards. Small trees growing between concrete crib members should be removed.

A quarterly inspection should be made of timber cribs and bulkheads. Any necessary repairs should be made promptly.

Gabion retaining walls allow good drainage of areas behind the wall. They are economical and especially appropriate when an impervious wall may result in a hydrostatic pressure problem. They are also suitable for assembly during any time of the year.

## **7. HOMELAND SECURITY**

**7.1. Introduction.** In 2005 an amendment to the Patriot Act was passed. This act, known as the US Patriot Act, Improvement and Reauthorization Act of 2005 (HR3199) adds dozens of additional safeguards. Due to catastrophic aggressive activities against the United States, Congress enacted the Patriot Act H.R.3162 in 2001. The Patriot Act was established to deter and punish terrorist acts in the United States and around the world, to enhance law enforcement investigatory tools; and for other purposes. Additionally, DOT Requirements 49 CFR 172.800 require mandatory measures intended to enhance the security of hazardous materials in transportation.

7.1.1. Precautions. There are precautionary actions that can be taken to help assure the security of work sites:

7.1.1.1. Discourage or prevent trespass by using fences or walls with locked gates, area lights, alarm systems, and video surveillance. Security guards, mobile patrols, and security clearance badges are further measures which may be used.

7.1.1.2. Limit damage by utilizing secondary containment systems for the storage of toxic chemicals; locate storage tanks and vehicles away from fences to prevent possible collision with vehicles, monitor fuel deliveries; develop and implement emergency communication systems; keep current material inventories; develop and implement emergency procedures; keep all equipment in good repair; conduct regular inspections; and keep employee emergency response training current.

7.1.2. Awareness of Local Installations. Awareness of local installations that might be a target for aggressive destructive activities against the United States will promote prompt appropriate response action in times of emergency. Such targets might include sites which could incur catastrophic and far reaching damage (i.e. blowing up a dam), or sites where the aggressive activities could result in a great loss of human life (i.e. poisoning a city water supply). Examples of such sites are listed below:

- Dams
- Refineries
- Bridges
- Water systems
- Fuel Storage Depots
- Airports
- Subways
- Tunnels
- Rail Stations/Railroad shipments
- Conference/Convention Centers

- Large public forums (Parades, New Year's Eve activities)
- Popular Tourist Attractions (Las Vegas, Disneyland)
- Highly populated business districts (Wall Street, Twin Towers)
- Hazardous Cargo Highway Routes & Shipments

## **8. TRAINING**

- 8.1. Employee Training Assessment.** The Supervisor should assess each employee's training needs annually after reviewing the knowledge, skill, and ability (KSA) required for maximum performance in a given position. Training needs should be determined based on an assessment of the employee's level of performance. Training may be authorized only as related to present duties or planned assignments, except for employees in a formal development program.
- 8.2. Economics of Training.** Identified training should be supplied at the most economic cost. Do not ignore the advantages of "on the job" training.
- 8.3. Training Criteria.** The following criteria should be observed when determining training for employees:
- 8.3.1. **Select Training.** The training selected should best meet a combination of development needs for the employee and the Bureau of Indian Affairs.
  - 8.3.2. **Training and Development Plan.** Training should be based upon an individual training and development plan for the employee.
  - 8.3.3. **Skills and Knowledge.** The training may be of current or anticipated importance in administrative, technical, or scientific skill or knowledge.
  - 8.3.4. **Promotion Potential.** If training enhances promotion potential, follow merit promotion procedures.
  - 8.3.5. **Description of Training.** Upon request, each candidate for formal training will be provided an accurate description of the training prior to participation. The description will cover the methods and materials used, conditions under which the candidate will participate, and what the employee is expected to accomplish as a result of the training. After review of the description, an employee has the right to withdraw from any training that appears to have potential for being personally offensive, psychologically stressful, or an invasion of privacy.
- 8.4. Prioritized Training.** In selecting and scheduling training, supervisors should give first priority to those courses and formal training which address identified shortfalls in the employee's core competencies. Second priority is given to training intended to meet the employee's future needs to develop competencies required for the employee's progress consistent with the Bureau's mission. The employee and supervisor should jointly identify the sequence of training needed to accommodate the employee's unique development needs.
- 8.5. Choosing Employees.** Managers are encouraged to choose employees who will benefit most from a training session and who can be expected to make the greatest contribution to the Government in the future.

- 8.6. Suggested Training List.** In order to assure that road maintenance activities are performed in compliance with all federal and local regulations and result in roads that are maintained in a safe and traversable condition for the traveling public, to the extent that funds are available, the following suggested training lists define minimum knowledge and skills that maintenance personnel should acquire.
- 8.7. Certification Program.** A Regional Road Maintenance Certification Program may be implemented to assure that personnel are as knowledgeable and proficient as required.
- 8.8. Training Requirements for Maintenance Supervisor**
- Basic Supervision
  - Advanced Supervision
  - Technical Supervision
  - Ethics & Conduct
  - Sexual Harassment
  - Defensive Driving
  - First Aid
  - Traffic Safety & Control (Flagging, Signing, etc.)
  - OSHA - Worker Safety, Hazard Communication Standard
  - Equipment Operations
  - Pavement Maintenance
  - Preventative Pavement Maintenance
  - Road Maintenance Operations
  - Bridge Maintenance Operations
  - Heavy Equipment Operator Certification Training
  - Security Awareness Training
  - Preventive Road Maintenance
  - Preventive Bridge Maintenance
  - Pavement Markings
  - MUTCD
  - EPA – RCRA, HazWoper, EPCRA, based on hazmat & hazwaste situation
  - DOT – Random Alcohol & Drug Testing, HM181/26f
  - Clean Water Act
  - Historic Preservation Act
  - Archeological Resources Protection Act
  - Noxious Weeds
  - Word processing
  - Computer generated spreadsheets
  - Program Planning
  - Program Budgeting
  - Program Scheduling
  - PL93-638
  - Tribal Codes
  - Global Information Systems (GIS)
  - Erosion Control



**8.9. Training Requirements for Maintenance Personnel.**

- Defensive Driving
- First Aid
- Traffic Safety & Control (Flagging, Signing, etc.)
- Ethics & Conduct
- Sexual Harassment
- OSHA - Worker Safety, Hazard Communication Standard
- Equipment Operations
- Road Maintenance Operations
- Bridge Maintenance Operations
- Heavy Equipment Operator Certification Training
- Security Awareness Training
- Clean Water Act
- Historic Preservation Act
- Archeological Resources Protection Act
- Noxious Weeds
- Word processing
- Computer generated spreadsheets
- Tribal Codes
- EPA – RCRA, HazWoper, EPCRA, based on hazmat & hazwaste situation

**9. Maintenance Management**

**[THIS SECTION HAS BEEN RESERVED FOR THE TRANSPORTATION FACILITIES MAINTENANCE MANAGEMENT SYSTEM.]**

## **10. TYPICAL MAINTENANCE ACTIVITY DESCRIPTIONS**

- 10.1. Maintenance General Guidelines.** The Bureau of Indian Affairs is required to develop and document realistic annual work programs. These programs consist of activities, descriptions, purpose, procedures, frequency and acceptance. The work activity should be identified by the actual work item and the activity code associated with that item. It should be described in a clear and concise manner to be readily understood. A clear intended purpose statement should be made for each activity. A list of procedures to accomplish the task or activity should be provided in sufficient detail. The frequency and acceptance of these activities will vary between Regions and Agencies due to levels of funding, location, climate and type of facilities. Therefore these guidelines must be tailored to the unique situation and circumstances of the Region or Agency.

On the adjacent page is the standard guideline form, followed by a Table of Activity Codes. The succeeding pages provide completed guideline examples for various activity codes.

Bureau of Indian Affairs - Maintenance General Guidelines		
Activity		Code
Description		
Purpose		
Procedures		
Frequency		
Acceptance		

**TABLE OF ACTIVITY CODES AND DESCRIPTIONS**

CODE	ACTIVITY DESCRIPTION
10	Surface Inspection
11	Grading & Reshaping
12	Crack Sealing
13	Patching Surface
14	Seal Coating
15	Repairing Base
16	Shoulder Maintenance
17	Approach Work
18	Surface Cleaning
20	Drainage Structures Inspection
21	Clean & Reshape Ditches
22	Clean Drainage Structure
23	Repair Drainage Structure
24	Repair Curb & Gutter
25	Repair Maintenance - Outside of R/W
26	Drainage Improvements
30	Bridge Cleaning and Inspection
31	Bridge Deck Repair & Inspection
32	Bridge Superstructure Repair
33	Bridge Substructure Maintenance
34	Channel Maintenance
40	Mowing / Vegetation Control / Road Patrol
41	Litter Pickup
42	Brush & Tree / Mowing & Vegetation Control /
43	Brush & Tree
50	Traffic Control Inspection Sign-clean, wash & inspect
51	Sign Maintenance
52	Delineator Maintenance
53	Striping
54	Signal & Lighting Maintenance
60	Guardrail Maintenance
61	Fence Repair
62	Cattle Guard Clean & Repair
63	Slope Protection Repair
64	Sidewalk Repair
70	Winter Preparation

71	Snow & Ice Control
72	Washout Repair
73	Slide Repair
74	Disaster Response
75	Ferry Maintenance
80	Shop Building Maintenance
81	Equipment Service - PM
82	Equipment Repair – minor
83	Equipment Repair – major
84	Equipment Acquisition
90	Leave & Holidays
91	Training
92	Permit Inspection
93	Contract Monitoring
94	General Operations
95	Maintenance Management Systems
96	Work for Others
97	Travel Time
98	Furlough

<b>Bureau of Indian Affairs – Maintenance General Guidelines</b>	
<b>Spot Surface Replacement - Paved Road</b>	
No Activity Code Assigned	
<b>Description</b>	The removal and replacement of deteriorated paved surfacing and shoulder material on an area large enough to use heavy equipment for the removal operations.
<b>Purpose</b>	To repair paved surface or shoulder that is larger than a pothole and which is deteriorated and requires replacement in order to provide a smooth and safe traveled way.
<b>Procedures</b>	<ul style="list-style-type: none"> <li>– Post appropriate warning signs in accordance with MUTCD</li> <li>– Determine that Spot patching is the most cost effective means of repair; reconstruction could be necessary if the area is extremely large.</li> <li>– Determine whether replacing the damaged pavement will fix the problem, or whether drainage, poor subgrade, overweight loads, or other factors caused, or contributed to, the failure.</li> <li>– If the repair requires more than removing and replacing the pavement, perform that work first.</li> <li>– When, and if, other problems have been repaired:</li> <li>– Remove damaged surface material</li> <li>– Saw cut to square the area to be patched</li> <li>– Compact base/subgrade material</li> <li>– Prime area if necessary</li> <li>– Tack area if applicable</li> <li>– Place hot or cold mix in layers 2" or less</li> <li>– Compact (roll or hand tamp) each layer</li> <li>– Level patched area to conform with surrounding pavement elevation</li> <li>– Roll surface to assure it is level and compact.</li> </ul>
<b>Frequency</b>	<p>Post warning signs within 1 day of notification that road condition is a traffic hazard</p> <p>Schedule work in the most cost effective manner; attempt to coordinate the work with other paving or patching work in the vicinity</p>
<b>Acceptance</b>	The finished surface should be smooth with no surface irregularities. Depressions or bumps should be repaired.

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Reconditioning of earth roads</b>	
No Activity Code Assigned	
<b>Description</b>	<p>This work consists of: scarifying and shaping the traveled way surface; working the loosened surface material across the road; rolling and compacting the re-worked surface material to provide a smooth, well draining surface; and cleaning ditches &amp; culverts.</p> <p>Gravel roads should not be reconditioned. Scarifying and windrowing the gravel contaminates the gravel surfacing with the underlying earth road materials.</p>
<b>Purpose</b>	<p>The purpose of reconditioning a dirt road is to loosen up the existing road surface in order to re-work it and make a compacted, smooth and well draining surface; to clean ditches and culverts and restore them to free draining; to properly dispose of debris removed</p>
<b>Procedures</b>	<ul style="list-style-type: none"> <li>– Install work zone traffic control signs in accordance with MUTCD</li> <li>– Scarify surface to a minimum of 4". Remove any rocks larger than 4" exposed during scarification.</li> <li>– Clean and shape ditches and culverts, adding suitable material to scarified surface material.</li> <li>– Work material across road to achieve a smooth, properly crowned, and well draining road.</li> <li>– Water and compact the road to maintain the smooth well draining surface.</li> <li>– Scatter rocks and unsuitable material outside of traveled way but within right-of-way, assuring that a safety hazard is not created.</li> </ul>
<b>Frequency</b>	<p>Recondition roads when surface grading is no longer effective in maintaining a smooth driving surface.</p>
<b>Acceptance</b>	<p>Finished road surface should be smooth, compacted, crowned at 1/2" -1" per foot, and should be free draining. Unsuitable material and rocks greater than 4" should be scattered outside the traveled way but within the right-of-way and should not constitute a safety hazard.</p>

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Grading &amp; Reshaping Gravel or Earth Surface Road</b>	
Activity Code:11	
<b>Description</b>	
Grading and shaping of non-paved road surface to smooth the riding surface in order to facilitate traffic and provide proper drainage.	
<b>Purpose</b>	
To restore crown, drainage, and ridability	
<b>Procedures</b>	
<ul style="list-style-type: none"> <li>– Place appropriate work zone traffic signs in conformance with MUTCD.</li> <li>– Only grade the surface when it is moist; do not grade when it is dry. Dry grading is generally a waste of time because the material does not stay on the road; it blows away leaving the surface in the same condition.</li> <li>– Keep equipment within the existing road prism; do not widen traveled way.</li> <li>– Keep equipment at the existing road elevation; do not increase the depth of the traveled way.</li> <li>– Grade moist surface material from edge of road to center of road. Re-mix material with roadway surface material.</li> <li>– Do not cut or excavate the road surface or ditch to obtain material; do not unnecessarily blade ditches to obtain material; do not blade back/fore slopes to obtain material; do not work off-road to obtain material.</li> <li>– Knock down ridges, windrows, and corrugations to level the surface. Remove rocks larger than 4".</li> <li>– Continue grading until a rooftop road crown of 1/2" to 1" per foot is re-established and surface is compact with no loose material.</li> </ul>	
<b>Frequency</b>	
Maintain gravel roads a minimum of three times a year. Maintain gravel bus routes a minimum of four times during the school year. Maintain earth roads a minimum of twice a year. Maintain earth school bus routes a minimum of four times during the school year.	
<b>Acceptance</b>	
Road surface should be smooth and crowned at 1/2"-1" per foot. Road should not be wider or deeper than originally existed	



<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Crack Sealing</b>	
Activity Code 12	
<b>Description</b>	
This activity consists of cleaning, filling, and sealing cracks in bituminous surface.	
<b>Purpose</b>	
The purpose of this activity is to prevent surface moisture from passing into underlying materials; and the intrusion of incompressible materials. It is also intended to prevent further edge deterioration and possible development into potholes.	
<b>Procedures</b>	
<ul style="list-style-type: none"> <li>– Install work zone traffic control signs in accordance with MUTCD</li> <li>– Crack sealing is not the solution for all types of cracks.</li> <li>– Generally alligator cracking and slippage cracks require additional repair besides crack sealing.</li> <li>– Cause of the cracks should be determined and repaired when necessary, prior to crack sealing .</li> <li>– Determine the appropriate method of crack treatment for the damaged pavement.               <ul style="list-style-type: none"> <li>1) Cracks with horizontal or vertical movement ( <math>\geq 0.1</math> in) = crack sealing</li> <li>2) Cracks with little horizontal or vertical movement ( <math>\leq 0.1</math>) = crack filling.</li> </ul> </li> <li>– In areas of significant temperature change, rout or saw cut the crack to achieve a shape that can provide sufficient flexibility to withstand high crack movements.</li> <li>– Determine appropriate material to treat crack. Follow manufacturer's instructions.</li> <li>– Clean and/or dry the crack using air blasting, hot air blasting, sandblasting, or wire brushing.</li> <li>– Pour free flowing material into crack and shape the material. Apply blotter material consistent with sealant.</li> </ul>	
<b>Frequency</b>	
Monitor cracks and seal or fill when they are over 3/16" wide.	
<b>Acceptance</b>	
A properly sealed crack demonstrates full depth adhesion and cohesion. The material completely fills the hole. Edge deterioration and secondary cracks have been repaired.	

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Patching Surface</b>	
Activity Code 13	
<b>Description</b>	<p>Patching potholes and leveling the surface of asphalt paved roads or short term emergency pothole patching of concrete paved roads using hot or cold asphalt plant mix, or asphalt pre-packaged cold mix.</p>
<b>Purpose</b>	<p>To restore a smooth riding surface and alleviate the spread of localized pavement failure.</p>
<b>Procedures</b>	<p>– Post appropriate warning signs in conformance with MUTCD</p> <p><b>Asphalt:</b></p> <p style="padding-left: 40px;">Pothole patching -</p> <p style="padding-left: 80px;">Clean out pothole, remove all loose debris</p> <p style="padding-left: 80px;">Saw cut and square up area to be repaired - vertically and horizontally</p> <p style="padding-left: 80px;">For hot/cold mix assure that interior is totally dry</p> <p style="padding-left: 80px;">For pre-packaged cold mix - follow manufacturer's directions</p> <p style="padding-left: 80px;">Tack sides of area to be patched</p> <p style="padding-left: 80px;">Prime area to be patched if necessary</p> <p style="padding-left: 80px;">Place mix in pothole in maximum 2" lifts</p> <p style="padding-left: 80px;">Compact by hand tamping or rolling each lift</p> <p style="padding-left: 80px;">Compact by hand tamping or rolling finished surface</p> <p style="padding-left: 80px;">Assure that patch conforms with surrounding pavement elevation</p> <p style="padding-left: 40px;">Level surface -</p> <p style="padding-left: 80px;">Clean surface</p> <p style="padding-left: 80px;">Assure surface is totally dry</p> <p style="padding-left: 80px;">Apply tack coat</p> <p style="padding-left: 80px;">Place mix in depression in maximum 2" lifts</p> <p style="padding-left: 80px;">Compact by rolling each lift</p> <p style="padding-left: 80px;">Compact by rolling finished surface</p> <p style="padding-left: 40px;">Concrete patching – (for short term emergency only)</p> <p style="padding-left: 80px;">Clean out pothole, remove all loose debris</p> <p style="padding-left: 80px;">For hot/cold mix assure that interior is totally dry</p> <p style="padding-left: 80px;">For pre-packaged cold mix - follow manufacturer's directions</p> <p style="padding-left: 80px;">Tack sides of area to be patched</p> <p style="padding-left: 80px;">Prime area to be patched if necessary</p> <p style="padding-left: 80px;">Place mix in pothole in maximum 2" lifts</p> <p style="padding-left: 80px;">Compact by hand tamping or rolling each lift</p> <p style="padding-left: 80px;">Compact by hand tamping or rolling finished surface</p> <p style="padding-left: 80px;">Assure that patch conforms with surrounding pavement elevation</p> <p>For EMERGENCY pothole patching in cold or inclement weather, assure that bags of pre-packaged cold mix are either on hand or readily available to use for quick temporary repairs.</p>

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Patching Surface (continued)</b>	
<b>Frequency</b>	<p>Patch potholes over 2" deep within 1 week of knowledge of pothole when possible.</p> <p>Level road surface when depressions are over 2" deep.</p> <p>Post appropriate warning signs (in conformance with MUTCD) within 1 day of notification that road condition is a traffic hazard.</p>
<b>Acceptance</b>	<p>Finished road surface should be smooth and free from surface irregularities such as depressions or bumps.</p> <p>Patches should fully adhere to surrounding pavement</p>

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Seal Coating (Chip Seal)</b>	
Activity Code 14	
<b>Description</b>	It is a thin asphalt surface treatment applied to a paved surface. It consists of a full width single treatment of asphalt material immediately covered by a single layer of uniform sized aggregate.
<b>Purpose</b>	A single surface treatment used as a waterproofing or wearing course which provides skid resistance and resistance to abrasion. It seals thin cracks, and bonds loose aggregate to the pavement surface. It restores surface life and flexibility and prevents further deterioration.
<b>Procedures</b>	<ul style="list-style-type: none"> <li>– Install work zone traffic control signs in accordance with MUTCD</li> <li>– Make all surface and base repairs, fill all cracks over 3/16", and perform all work necessary to repair the road.</li> <li>– Power broom road thoroughly and clear grass from edge of pavement. Keep brooming operation close to distributor operations to assure clean pavement.</li> <li>– Spray bituminous material at proper rate and temperature on clean pavement.</li> <li>– Spread aggregate uniformly at specified rate immediately behind distributor.</li> <li>– Roll and compact, using overlapping passes, with a pneumatic roller</li> <li>– Hand broom to remove excess aggregate from roadway. Disperse aggregate well into side vegetation.</li> </ul>
<b>Frequency</b>	Apply a chip seal approximately 2 - 5 years after the road was paved. At that stage the road is not old and weathered and the chip seal will protect it and prolong service life.
<b>Acceptance</b>	This work is considered acceptable when the surface of the pavement is uniformly treated and aggregate is adhering, and excess material has been removed from shoulders and site if necessary.

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Repairing Base</b>	
Activity Code 15	
<b>Description</b>	The removal of failed base or subgrade material and the replacement with suitable material.
<b>Purpose</b>	The purpose of repairing the base is to build a strong foundation in order to prevent settlement or failure of the road surface.
<b>Procedures</b>	<ul style="list-style-type: none"> <li>– Post work zone traffic control signs in accordance with MUTCD</li> <li>– Cut out and remove surface course.</li> <li>– Remove failed base or subgrade material.</li> <li>– Remove these materials from the site and dispose properly.</li> <li>– Determine and repair the cause of the failure.</li> <li>– If there is water in the subgrade, determine where it came from.</li> <li>– Water seeping in from the cut slope can be remedied by installing a drain in the ditchline to intercept the seepage.</li> <li>– Water in the subgrade from an underground spring at the site can be remedied by installing an underdrain or french drain, or the appropriate geotextile fabric, or a combination.</li> <li>– Let the site remain open for a couple of days, to assure that the water problem has been taken care of.</li> <li>– Make sure that during this time that the warning signs and barriers (if needed) are in good repair.</li> <li>– Once the subgrade problem has been fixed, place appropriate base material in 6" layers in the hole. Compact each layer to the proper density to assure that the patched surface does not settle.</li> <li>– Replace and compact the surface course level with the surrounding pavement or gravel.</li> </ul>
<b>Frequency</b>	A project of this magnitude should be scheduled and carefully planned in order to complete it timely and successfully in the most cost effective manner. Post and maintain appropriate warning signs until the work can be accomplished.
<b>Acceptance</b>	The finished surface patch should be entirely sealed and level with the surrounding pavement. The repair should last indefinitely. A similar type failure occurring at the site within a year is unacceptable and indicates that the work was not properly performed.

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Shoulder Maintenance</b>	
Activity Code 16	
<b>Description</b>	<p>This work applies to paved roads.</p> <p>Paved Shoulder: grading shoulders in order to bring material against the edge of the pavement surface.</p> <p>Graveled Shoulder: grading shoulders in order to bring material against the edge of the gravel surface.</p> <p>Earth Shoulder: grading shoulder to keep granular material in the shoulder</p>
<b>Purpose</b>	<p>Shoulders should be maintained in order to provide lateral support for the road and to provide emergency/safety travel lanes.</p> <p>Shoulders should be maintained level with the road surface, to a condition that allows water to drain off the road and into the ditch and provides a level surface for vehicles.</p>
<b>Procedures</b>	<ul style="list-style-type: none"> <li>– Post appropriate warning signs in conformance with MUTCD.</li> <li>– <b>Paved shoulder:</b> Seal the longitudinal joint between pavement and shoulder to keep water away from the paved road. Patch potholes on the shoulder.</li> <li>– <b>Graveled shoulder:</b> Reshape shoulder and remove ruts; add aggregate as necessary to keep shoulder level with road; reshape to allow drainage off road.</li> <li>– <b>Earth shoulder:</b> Carefully reshape shoulder to remove ruts without unduly damaging shoulder vegetation; reshape to allow drainage off road.</li> <li>– Make one pass with the grader to cut off high spots and pull material against road.</li> <li>– Spot dump additional material as needed along the shoulder. Slope of shoulder should be between 3/4" per foot to 1 1/2" per foot.</li> <li>– Compact shoulder to provide firm stable surface. Remove excess material from road.</li> </ul>
<b>Frequency</b>	<p>Maintain the shoulders often in order to protect and prolong the life of the road.</p>
<b>Acceptance</b>	<p>A well maintained shoulder will be smooth and level with the existing road; will allow water to drain off the road; will not have the vegetation (in the case of earth shoulder) scraped off; and will be compact without ruts, cracks, or potholes.</p>

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Approach Work</b>	
Activity Code 17	
<b>Description</b>	
This work consists of the maintenance of surface and sideslopes of driveway and intersections within ROW	
<b>Purpose</b>	
These areas are maintained to assure that they drain and are safe to use.	
<b>Procedures</b>	
<ul style="list-style-type: none"> <li>– Post work zone traffic control signs in accordance with MUTCD</li> <li>– Seal cracks and patch potholes in paved surface and shoulders.</li> <li>– Grade and shape the surface of an earth or gravel road at intersections and driveways to provide a smooth transition onto them from the road. Remove ruts and pull shoulder against road.</li> <li>– Shape fill slopes to maintain a smooth safe slope; vertical slopes are not allowed. Remove large rocks and debris, shape slopes at culvert inlet and outlet.</li> </ul>	
<b>Frequency</b>	
Approach work should be performed when necessary to maintain a safe well draining intersection or driveway.	
<b>Acceptance</b>	
Completed approach work is acceptable when the transition from road into an intersection or driveway is smooth and well draining; when there are no vertical fill slopes or drop offs; and when the fill around culvert inlets and outlets is properly shaped.	

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Surface Cleaning</b>	
Activity Code 18	
<b>Description</b>	Includes all work involved in sweeping of roads and sidewalks.
<b>Purpose</b>	The purpose of this activity is to keep paved areas (roads, shoulders, sidewalks) clean in order to prolong the life of pavement markings, service life of the pavement, and to provide a safe driving and walking surface.
<b>Procedures</b>	<ul style="list-style-type: none"> <li>– Post work zone traffic control signs in accordance with MUTCD.</li> <li>– Sweep roads beginning in the middle of the road and progressing to the curb in each direction.</li> <li>– Work in the direction of traffic. Have hand tools or equipment on site to pick up and remove material cleaned off road.</li> <li>– Power sweep or hand broom sidewalks. Remove debris and dispose properly.</li> </ul>
<b>Frequency</b>	<p>Clean roads and sidewalks when necessary. Generally this will be accomplished several times per year to remove snow and ice control materials used during the winter as well as mud and dirt tracked onto the surface during and after rains.</p> <p>High traffic volume roads require cleaning more often</p>
<b>Acceptance</b>	Surface cleaning is acceptable when the surface is visibly clean and there are no windrows of debris.



<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Drainage Structure Inspection</b>	
Activity Code 20	
<b>Description</b>	
This activity consists of inspecting all aspects of a drainage structure and documenting the inspection and findings.	
<b>Purpose</b>	
The purpose of this activity is to prolong the service life of a drainage structure by identifying problems in order to schedule and perform the work in an efficient and cost effective manner.	
<b>Procedures</b>	
<ul style="list-style-type: none"> <li>– Park the vehicle off the road with blinkers and beacon flashing to alert traffic.</li> <li>– Wear high visibility clothing and PPE.</li> <li>– Inspect inlet and outlet for structural damage and debris or sediment build up; slopes around inlet and outlet for erosion and proper slope - vertical slope not allowed; catch basins for debris and erosion; interior of culvert for sedimentation and structural damage; outlet channel for erosion and debris; slope stabilization for loose rock and erosion; slope paving and headwalls for cracks and erosion; and low water crossings for a stable road surface.</li> </ul>	
<b>Frequency</b>	
Inspect drainage structures on a fixed schedule each year and after every major weather event which could affect the structure.	
<b>Acceptance</b>	
The work is acceptable when each inspection has been performed and documented in a timely manner to allow scheduling of work in cost effective manner.	

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Clean and Reshape Ditches</b>	
Activity Code 21	
<b>Description</b>	
This activity consists of cleaning debris from the ditch and smoothing and shaping ditches with a motor grader to maintain flow in the ditch line of paved, gravel and earth roads.	
<b>Purpose</b>	
The purpose of this activity is to keep ditches functional and flowing in order to avoid erosion and damage to the road.	
<b>Procedures</b>	
<ul style="list-style-type: none"> <li>– Post work zone traffic control signs in accordance with MUTCD.</li> <li>– Carefully remove and dispose debris that is obstructing flow - this could require hand labor</li> <li>– Do not grade bottom or slopes if ditch is functioning.</li> <li>– Gently grade and shape bottom and slopes when necessary to restore drainage.</li> <li>– Do not remove or unnecessarily destroy vegetation; vegetation stabilizes the ditch.</li> <li>– Do not undercut slopes</li> <li>– Do not shave slopes</li> <li>– Do not disturb functioning ditch blocks or check dams</li> <li>– Make minimum passes to shape and dress slopes if necessary to restore flow</li> <li>– Repair erosion that is unstable and will continue to enlarge.</li> <li>– Do not disturb stabilized erosion.</li> </ul>	
<b>Frequency</b>	
Clean and reshape ditches according to a fixed schedule each year. Inspect them after every major weather event which could adversely affect them. Schedule and perform ditch repair as needed.	
<b>Acceptance</b>	
Ditch work is acceptable when the ditch is flowing; vegetation has not been unnecessarily destroyed; the slopes and ditch bottom have not been scraped or shaved; and appearance of ditch blends in with surrounding topography.	

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Clean Drainage Structure</b>	
Activity Code 22	
<b>Description</b>	<p>This activity consists of cleaning: catch basins, culverts, drainage structures with a span less than 20', paved ditches, inlet and outlet ditches. Hand work may be necessary.</p>
<b>Purpose</b>	<p>The purpose of this activity is to keep drainage structures clean and functioning in order to prevent erosion and possible road damage.</p>
<b>Procedures</b>	<ul style="list-style-type: none"> <li>– Post work zone traffic control signs in accordance with MUTCD</li> <li>– Clean and remove dirt and debris from catch basins; culvert inlet and outlet; inlet and outlet ditches; culverts and structures with less than 20' span; and paved ditches. Hand work will be required.</li> <li>– Dispose of litter removed during cleaning. Other debris removed may be scattered within the ROW as long as it does not become a safety hazard.</li> </ul>
<b>Frequency</b>	<p>Clean drainage structures on a fixed schedule each year and inspect after every major weather event which could affect the structure. Schedule and perform emergency drainage cleaning as necessary.</p>
<b>Acceptance</b>	<p>Acceptable clean drainage structures are those that are clean of debris, litter, and sedimentation and are flowing freely.</p>

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Repair Drainage Structure</b>	
Activity Code 23	
<b>Description</b>	
This activity consists of repairing catch basins; culvert inlet and outlet; inlet and outlet ditches; culverts and drainage structures with less than a 20' span; and paved ditches.	
<b>Purpose</b>	
The purpose of this activity is to keep drainage structures repaired and functional in order to avoid possible erosion and road damage.	
<b>Procedures</b>	
<ul style="list-style-type: none"> <li>– Post work zone traffic control signs in accordance with MUTCD.</li> <li>– Repair or replace damaged grates on catch basins</li> <li>– Repair damaged culvert inlet and outlet.</li> <li>– Repair or replace culverts with structural damage, or that have settled, pushed out of line, or are badly eroded.</li> <li>– Remove vegetation from paved ditches, seal cracks, and patch potholes</li> </ul>	
<b>Frequency</b>	
<p>Repair drainage structures as scheduled each year and inspect after every major weather event which could affect the structure.</p> <p>Schedule and perform emergency drainage repair as necessary.</p>	
<b>Acceptance</b>	
Acceptable drainage structure repairs are those that are functional as indicated by flowing freely.	

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Repair Curb &amp; Gutter</b>	
Activity Code 24	
<b>Description</b>	This activity consists of repairing paved road curb and gutter to a functional and safe level.
<b>Purpose</b>	The purpose of this activity is to assure that paved road curbs and gutters are functioning as necessary to keep roads free of standing water and safe for the traveling public.
<b>Procedures</b>	<ul style="list-style-type: none"> <li>– Post work zone traffic control signs in accordance with MUTCD.</li> <li>– Clean and dry repair site.</li> <li>– <b>Concrete curb and gutter:</b></li> <li>– Seal cracks and joints with appropriate material.</li> <li>– Patch spalled and damaged areas with concrete or mortar or other suitable material</li> <li>– Remove and replace areas damaged beyond repair. Use appropriate concrete forming, placement, and finishing techniques to achieve a professional repair.</li> <li>– <b>Asphalt curb and gutter:</b></li> <li>– Seal cracks and joints with appropriate material.</li> <li>– Patch potholes and damaged areas with suitable asphalt material</li> <li>– Replacing damaged asphalt curb requires the use of a curb machine or paver with curb attachment.</li> <li>– Schedule all curb replacement to be performed at the same time to minimize costs.</li> </ul>
<b>Frequency</b>	<p>Repair curb and gutter as scheduled each year.</p> <p>Post warning signs in conformance with MUTCD for areas that present a safety hazard and will not be repaired immediately.</p>
<b>Acceptance</b>	Acceptably repaired curb and gutter are those that are functioning properly; have been patched/repared in a professional manner that is aesthetically pleasing; and blends in with surrounding curb and gutter.

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Preventive Maintenance of Drainage Outside of ROW</b>	
Activity Code 25	
<b>Description</b>	
This work consists of performing preventive maintenance and repairing drainage that is outside of the ROW.	
<b>Purpose</b>	
The purpose of the activity is to assure that drainage associated with the road is functioning properly by performing preventive maintenance on channels, furrow ditches, and outlet ditches that are constructed outside the ROW.	
<b>Procedures</b>	
<ul style="list-style-type: none"> <li>– Obtain documented consent from land owner to perform work on his property.</li> <li>– Obtain documented environmental and archeological clearance to perform the work.</li> <li>– Assure that work is in accordance with federal laws and Tribal code.</li> <li>– Inform land owner of the work and the schedule in which it will be performed. Assure that all activities protect land and personal property of land owner.</li> <li>– Maintenance in this activity will generally consist of using a grader to clean and smooth the furrow ditches, hand labor to repair outlet riprap, drainage channel restoration work and slope stabilization restoration work. Equipment and manpower requirements will have to be determined on the basis of work required.</li> </ul>	
<b>Frequency</b>	
<p>Perform preventive maintenance as scheduled each year and inspect after every major weather event which could affect drainage.</p> <p>Schedule and perform emergency drainage repair as necessary.</p>	
<b>Acceptance</b>	
<p>Drainage preventive maintenance performed outside the ROW is acceptable when it is functioning properly so that there are no adverse impacts on BIA drainage structures and roads. It is further exhibited when all ground disturbance has been smoothed, all cut fences repaired, all interim temporary damage to land owner's property has been repaired and the ground restored to original condition.</p>	

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Drainage Improvements</b>	
Activity Code 26	
<b>Description</b>	
This activity consists of performing minor drainage improvements such as installing a culvert, riprap, inlet or outlet protection, and erosion control.	
<b>Purpose</b>	
The purpose of this activity is to improve the drainage in order to protect the road and surrounding lands. Drainage improvements may only be performed to protect the road and safeguard the traveling public.	
<b>Procedures</b>	
<ul style="list-style-type: none"> <li>– Assure that you are authorized to perform the work on the road. That is, is it within the BIA ROW, implied ROW, easement, etc?</li> <li>– Assure that you have environmental and archeological documentation allowing the work.</li> <li>– Assure that work complies with all Federal laws and Tribal Codes specifically Sections 401, 404, 402 of the Clean Water Act</li> <li>– Perform the survey necessary to obtain design data and perform, or obtain, a design for the project</li> <li>– Maintain a project file with design drawings.</li> <li>– Perform the work in accordance with the design; consult designer when on-the-ground. conditions do not match the design and a change should be made.</li> <li>– Perform all field work in strict accordance with safety policy.</li> <li>– Post warning signs in accordance with MUTCD until the work can be accomplished if it presents a safety hazard.</li> </ul>	
<b>Frequency</b>	
Perform drainage improvements only when it has been determined that proper maintenance of the site will not alleviate the problem. A thorough investigation should have been performed and there Should be plans and specifications for the work.	
<b>Acceptance</b>	
Drainage improvement work is acceptable when the plans and specifications for the work have been complied with; the site has been smoothed and shaped; all construction litter and debris cleaned up and removed from site; and the completed project is functioning as planned.	

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Bridge Cleaning &amp; Inspection</b>	
Activity Code 30	
<b>Description</b>	<p>This activity consists of performing and documenting bridge inspections between regularly scheduled contract. Inspections as well as the cleaning of bridge approaches, decks, expansion joints, and signs.</p>
<b>Purpose</b>	<p>The purpose of this activity is to inspect and clean the bridge according to an annual schedule in order to note deficiencies and problems that have occurred since the last Contract Inspection. Depending on the severity of the deficiency, the repair work may need to be scheduled promptly. Bridge cleaning is necessary to prolong the service life and safeguard the traveling public.</p>
<b>Procedures</b>	<ul style="list-style-type: none"> <li>– Post work zone warning signs in accordance with MUTCD</li> <li>– Use power broom and hand tools to clean the deck and sidewalks.</li> <li>– Clean drains, grates, and joints.</li> <li>– Remove and dispose of debris &amp; litter; do not place in drainage channel.</li> <li>– Inspect the deck and substructure while on site. Document the inspection.</li> <li>– Notify supervisor of problems noted.</li> </ul>
<b>Frequency</b>	<p>Clean and inspect bridge on a fixed schedule each year and after every major weather event which could affect it.</p>
<b>Acceptance</b>	<p>Acceptable bridge cleaning is when the deck has been cleaned of litter/debris and the material has been removed and disposed properly.</p> <p>Bridge inspection is acceptable when the inspection has been completed and documented and proper authority has been notified of the result.</p>



<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Bridge Deck Repair &amp; Inspection</b>	
Activity Code 31	
<b>Description</b>	
This activity consists of maintenance on the bridge superstructure.	
<b>Purpose</b>	
The purpose of this activity is to perform repairs in order to prolong the service life of the bridge and safeguard the traveling public.	
<b>Procedures</b>	
<ul style="list-style-type: none"> <li>– Post work zone traffic control signs in accordance with MUTCD.</li> <li>– Review Contract Inspection and employee inspection notes to determine work needed.</li> <li>– Perform all maintenance activities in accordance with AASHTO.</li> <li>– <b>Concrete:</b> <ul style="list-style-type: none"> <li>– Identify scaling, spalling, cracking, and pop-outs on concrete deck surface.</li> <li>– Carefully remove deteriorated scaled concrete - do not damage reinforcing steel. Repair deck as you would a concrete pavement.</li> <li>– Determine extent of spalling and repair appropriately.</li> <li>– Seal isolated cracks with; consider a concrete overlay if there is severe cracking.</li> </ul> </li> <li>– <b>Asphalt:</b> <ul style="list-style-type: none"> <li>– Alligator and slippage cracks are repaired by removing the asphalt wearing course down to the concrete. Make necessary repairs to concrete. Replace the asphalt wearing course using typical paving or patching procedures.</li> <li>– Joint cracks, edge cracks and reflection cracks are repaired by cleaning and drying the crack and filling it with an emulsion slurry or liquid asphalt mixed with sand.</li> </ul> </li> <li>– <b>Wood:</b> <ul style="list-style-type: none"> <li>– In wood decks, areas of decay should be cut out and replaced with treated timber and sealant.</li> <li>– Replace worn running planks with suitable treated planks.</li> <li>– Replace broken planks.</li> <li>– Replace worn, broken, and missing fasteners.</li> </ul> </li> </ul>	
<b>Frequency</b>	
Repair bridge decks on a fixed schedule each year. Schedule and perform emergency bridge repair as necessary.	
<b>Acceptance</b>	
Bridge deck repair is acceptable when repairs are completed in accordance with approved methods and as-built drawings. Acceptable bridge superstructure maintenance is when work on all elements have been completed, inspected and approved.	

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Bridge Superstructure Repair</b>	
Activity Code 32	
<b>Description</b>	<p>The superstructure consists of the following:</p> <ul style="list-style-type: none"> <li>- DECK ELEMENTS; <ul style="list-style-type: none"> <li>Safety Features: Sidewalks, curbs, railings, expansion joints, scuppers, downspouts, pedestrian fence</li> <li>Riding Surfaces: Wearing surfaces (concrete, asphalt, steel, timber), reinforced concrete slab, steel plates or grids, wooden planking</li> </ul> </li> <li>- PRIMARY SUPPORT ELEMENTS; <ul style="list-style-type: none"> <li>Beams or Girders: Rolled steel, steel plate (built up), reinforced concrete, prestressed concrete, post tensioned concrete, timber.</li> <li>Trusses</li> <li>Secondary Support Elements: Diaphragms, cross bracing, tie rods.</li> </ul> </li> <li>- BEARING ELEMENTS; <ul style="list-style-type: none"> <li>- neoprene pads, elastomeric pads, fixed connections, rockers, rollers, bronze plates, lead plates, pins, cantilever hinges, shoe plates, shims</li> </ul> </li> </ul>
<b>Purpose</b>	<p>The purpose of this activity is to maintain a bridge in its current condition if it is safe and capable of carrying the traffic loads that were intended for it, or to repair a bridge that is not safe and not able to carry the intended traffic loads. When traffic loads should be reduced, Load Limit postings should be based on a load rating structural analysis by the structural engineer.</p>
<b>Procedures</b>	<ul style="list-style-type: none"> <li>– Refer to and utilize the information provided in the latest Bridge Inspection Report to prioritize, plan, schedule, and budget for maintenance and repair work.</li> <li>– Utilize appropriate traffic control based on the MUTCD for the type of work to be performed.</li> <li>– Clean and perform routine maintenance on the applicable elements listed above.</li> <li>– Inspect the elements being cleaned and maintained for damage, deterioration, vandalism, missing parts, and other concerns that may effect its performance as originally intended.</li> <li>– Elements no longer in good or safe working condition will require repair. Perform repairs per the element manufacturer's recommendations, or per instructions and/or plans and specifications provided by the Maintenance Engineer or Structural Engineer.</li> <li>– Repairs to any load carrying elements (some riding Surfaces and all Primary Support Elements) should not be made until the Maintenance Engineer or the Structural Engineer have inspected the element(s) and have developed plans and specifications for the repair. The subsequent repair of load carrying elements may or may not require the direct supervision of the Engineer.</li> <li>– Repairs beyond the ability of the maintenance personnel may require a contract with an outside source.</li> <li>– Document all cleaning, maintenance, inspection and repair work, including a summary of all actions, equipment used, personnel used, and costs.</li> </ul>
<b>Frequency</b>	<p>Superstructure maintenance should be performed at least once a year for each bridge.</p>
<b>Acceptance</b>	<p>Acceptable bridge superstructure maintenance is when work on all elements have been completed, inspected and approved.</p>

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Bridge Substructure Maintenance</b>	
Activity Code 33	
<b>Description</b>	<p>The substructure consists of the following:</p> <ul style="list-style-type: none"> <li>- ABUTMENT ELEMENTS; <ul style="list-style-type: none"> <li>- cap, backwall, beam seats, wingwalls, piles, footings, drilled shafts, approach slab seat, breast walls, beam anchor bolts, drainage features such as weep holes, embankment surrounding abutment,</li> </ul> </li> <li>-PIER or BENT ELEMENTS <ul style="list-style-type: none"> <li>- cap, beam seats, piles, footings, drilled shafts, pier walls, beam anchor bolts, cross bracing, debris protection.</li> </ul> </li> </ul>
<b>Purpose</b>	<p>The purpose of this activity is to maintain a bridge in its current condition if it is safe and capable of carrying the traffic loads that were intended</p>
<b>Procedures</b>	<ul style="list-style-type: none"> <li>– Refer to and utilize the information provided in the latest Bridge Inspection Report to prioritize, plan, schedule, and budget for maintenance and repair work.</li> <li>– Utilize appropriate traffic control based on the MUTCD for the type of work to be performed.</li> <li>– Clean and perform routine maintenance on the applicable elements listed above.</li> <li>– Inspect the elements being cleaned and maintained for damage, deterioration, vandalism, missing parts, and other concerns that may effect its performance as originally intended</li> <li>– Elements no longer in good or safe working condition will require repair. Perform repairs per the element manufacturer's recommendations, or per instructions and/or plans and specifications provided by the Maintenance Engineer or Structural Engineer.</li> <li>– Repairs to any load supporting elements should not be made until the Maintenance Engineer or the Structural Engineer have inspected the element(s) and have developed plans and specifications for the repair. The subsequent repair of load carrying elements may or may not require the direct supervision of the Engineer.</li> <li>– Repairs beyond the ability of the maintenance personnel may require a contract with an outside source.</li> <li>– Document all cleaning, maintenance, inspection and repair work, including a summary of all actions, equipment used, personnel used, and costs.</li> </ul>
<b>Frequency</b>	<ul style="list-style-type: none"> <li>- Superstructure maintenance should be performed at least once a year for each bridge.</li> </ul>
<b>Acceptance</b>	<p>Acceptable bridge superstructure maintenance is when work on all elements have been completed, inspected and approved.</p>

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Road Patrol</b>	
Activity Code 40	
<b>Description</b>	<p>This activity consists of inspecting roads and roadsides for overall condition. It encompasses inspection of the surface, drainage structures, and cursory bridge inspections to identify damage after severe weather events. The inspections are documented and findings are reported to supervisor.</p>
<b>Purpose</b>	<p>The purpose of this activity is to inspect and report on the condition of roads, roadside and appurtenances</p> <p>The purpose of this activity is also to identify damage to roads, roadsides, drainage structures, and bridges resulting from severe weather or other disasters.</p>
<b>Procedures</b>	<ul style="list-style-type: none"> <li>– Inspect the road using either the design drawings or the constructed as-built plans. A mileage meter or vehicle odometer will be needed to determine the location and length of problem areas in the following: surface of road; roadside ditches; fences; guardrails; drainage dips, furrow ditches, cattle guards, etc.</li> <li>– Inspection results should be documented. Report should show: Inspector(s) name, date, route number, direction of travel, miles inspected, location and length of problem areas, description of problem, average LOS for the surface in accordance with illustrated guide.</li> <li>– Inspect the road during periods of low traffic volume. Use vehicle headlights, flashers, and rotating beacon to alert the traveling public. Pull off the road entirely when you need to stop and make a measurement or write notes. Wear high visibility clothing and PPE..</li> <li>– Assure that all safety precautions and necessary traffic control measures are taken to protect the inspector and the traveling public.</li> </ul>
<b>Frequency</b>	<p>Inspections should be performed at least quarterly; when complaints are received; and whenever conditions changes; i.e. after severe weather and other disasters.</p>
<b>Acceptance</b>	<p>The work is complete and accepted when the inspection is fully documented and appropriate superiors have been notified of the result.</p>

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Litter Pickup</b>	
Activity Code 41	
<b>Description</b>	<p>This activity consists of picking up and disposing trash, litter, dead animals, debris and other materials within ROW.</p> <p>This also involves gathering bagged refuse collected and left by others along the roadway.</p>
<b>Purpose</b>	<p>The purpose of this activity is to keep the roadway within the ROW litter free and safe for the traveling public.</p>
<b>Procedures</b>	<ul style="list-style-type: none"> <li>– Post work zone traffic control signs in accordance with MUTCD.</li> <li>– Park vehicles off the road with blinkers and beacon flashing to alert traffic.</li> <li>– Wear high visibility clothing and PPE.</li> <li>– Litter will be picked up and collected in approved containers. The containers will be deposited in an approved disposal facility. Roadsides should be kept free of litter and debris to maintain the highway in a neat, clean and attractive manner.</li> <li>– The remains of animals killed by motor vehicles should be removed from the roadway and disposed as soon as possible after reported or observed. Report to the local police or wildlife authorities when large domestic animals and other exotic wildlife are removed from the roadway.</li> <li>– Requirements of tribal laws may regulate the manner of disposition of property found along the highways. The responsibility of removal of abandoned automobiles, for example, usually is assigned to law enforcement agencies. There should be instructions that will advise maintenance personnel as to procedures to be used for removal of abandoned vehicles and other property alongside roadways, particularly if they represent a hazard and need immediate removal.</li> </ul>
<b>Frequency</b>	<p>Pick up litter on a fixed schedule each year and after large public gatherings in the vicinity.</p>
<b>Acceptance</b>	<p>Litter pickup is acceptable when the roadway within the ROW is clean, including fences, and material picked up has been removed and disposed properly.</p>

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Brush and Tree Removal</b>	
Activity Code 43	
<b>Description</b>	This work consists of removing large vegetation over 4 feet tall and 3 inches in diameter including overhanging tree branches protruding into the road traveled way.
<b>Purpose</b>	The purpose of this activity is to maintain a safe traveled way without sight obstructions.
<b>Procedures</b>	<ul style="list-style-type: none"> <li>– Post work zone traffic control signs in accordance with MUTCD.</li> <li>– Remove brush, trees, and overhangs using heavy equipment, chain saws, and other hand tools.</li> <li>– All large tree removal will be performed under a service contract and proper approval obtained prior to any work being started.</li> <li>– Dispose of debris and brush properly. It may be scattered outside the roadway but within the ROW if such disposal does not pose a safety hazard.</li> </ul>
<b>Frequency</b>	Perform work in accordance with a schedule for other similar work in order to minimize costs.
<b>Acceptance</b>	This work is acceptable when brush and trees have been properly removed and disposed.

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Cattleguard Clean &amp; Repair</b>	
Activity Code 62	
<b>Description</b>	
This activity consists of inspecting, repairing, replacing, and cleaning cattle guards.	
<b>Purpose</b>	
The purpose of this activity is to keep cattle guards in good repair in order to prevent livestock from entering onto the ROW	
<b>Procedures</b>	
<ul style="list-style-type: none"> <li>– Post work zone traffic control signs in accordance with MUTCD if work or equipment will infringe onto roadway and cattle guards.</li> <li>– Repair metal grates, wing brace post and assemblies, and foundations that are damaged. roadway. Replace rotted timber bases and failed cast in place concrete bases.</li> <li>– Remove unapproved or unauthorized modifications such as strung cables, earth embankments, and wire gates that restrict access. Remove livestock such as horses and cattle stuck in the metal grates. Clean out earth and mud accumulations from the bases.</li> </ul>	
<b>Frequency</b>	
Clean and inspect cattle guards on a fixed schedule each year and after receiving complaints.	
<b>Acceptance</b>	
This work is considered acceptable when cattle guards are cleaned and repaired on schedule and within 1 week of receiving complaint.	

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Slope Protection Repair</b>	
Activity Code 63	
<b>Description</b>	This activity consists of repairing slope protection paving, fabric, and riprap to minimize erosion.
<b>Purpose</b>	The purpose of this activity is to keep slope protection in good repair in order to prevent erosion and subsequent damage to the road.
<b>Procedures</b>	<ul style="list-style-type: none"> <li>– Post work zone traffic control signs in accordance with MUTCD</li> <li>– Review as-built construction plans for proper materials, configuration, construction methods, etc.</li> <li>– Repair damaged slope protection fabric, if beyond repair, replace fabric. .</li> <li>– Repair damaged riprap. Repair damaged slope paving.</li> <li>– Existing shoulder material is re-graded and re-shaped the entire width to direct drainage away from the traveled roadway. Unwanted vegetation and other unsuitable materials may be graded back into the fore-slopes adjacent to the paved roadway.</li> </ul>
<b>Frequency</b>	Inspect and repair slope protection on a fixed schedule each year and after every major weather event which could affect it.
<b>Acceptance</b>	This work is considered acceptable when slope protection is inspected and repaired on schedule and emergency repairs are made timely to prevent erosion or failure of the slope or slope protection.



<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Sidewalk Repair</b>	
Activity Code 64	
<b>Description</b>	
This activity consists of repairing and replacing sidewalks.	
<b>Purpose</b>	
The purpose of this activity is to keep sidewalk in good repair to facilitate its safe use.	
<b>Procedures</b>	
<ul style="list-style-type: none"> <li>– Post work zone traffic control signs in accordance with MUTCD.</li> <li>– Repair concrete sidewalks by removing and replacing damaged sections including upheavals.</li> <li>– Use approved concrete mix and make repairs in accordance with design plans.</li> <li>– Replace joint fillers on sidewalks using approved materials specified in the design plans.</li> </ul>	
<b>Frequency</b>	
Inspect and repair sidewalks on a fixed schedule each year and after receiving complaints.	
<b>Acceptance</b>	
This work is considered acceptable when the sidewalks are inspected and repaired on schedule and after receiving complaints. Post pedestrian warning signs or close the sidewalk to pedestrian traffic if the sidewalk damage constitutes a safety hazard.	

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Winter Preparation</b>	
Activity Code 70	
<b>Description</b>	<p>This work consists of stockpiling snow and ice control materials; inspecting equipment for Readiness; mounting plows and sanders as necessary; training crews; and performing practice operations.</p>
<b>Purpose</b>	<p>The purpose of this activity is to prepare and be ready in order that snow and ice control operations will proceed smoothly and safely when freezing weather sets in.</p>
<b>Procedures</b>	<ul style="list-style-type: none"> <li>- Update and submit "Annual Snow &amp; Ice Control Plan".</li> <li>- Conduct 'Winter Preparedness' meeting to discuss operations. Schedule and conduct training in safety, equipment use and maintenance, and materials use.</li> <li>- Inspect stockpiled materials and order more if necessary.</li> <li>- Practice mounting equipment and loading materials.</li> <li>- Practice plowing and spreading materials.</li> </ul>
<b>Frequency</b>	<p>Conduct winter preparedness meeting and training on a fixed schedule each year. Conduct these early enough to be ahead of the winter conditions, but not so far ahead that all practice operations and training is forgotten</p>
<b>Acceptance</b>	<p>This work is considered acceptable when the "Annual Snow &amp; Ice Control Plan" is updated on schedule and snow and ice control operations proceed generally smoothly.</p>

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Snow &amp; Ice Control</b>	
Activity Code 71	
<b>Description</b>	
This activity consists of implementing the plan for winter snow and ice control and/or removal and other emergency operations.	
<b>Purpose</b>	
The purpose of this activity is to keep the roads in a reasonably safe condition during winter weather.	
<b>Procedures</b>	
<ul style="list-style-type: none"> <li>– Post work zone traffic control signs in accordance with MUTCD.</li> <li>– Implement snow and ice removal according to plan and priority established when unsafe weather conditions begin.</li> <li>– Keep in contact with local authorities and Tribal emergency management departments.</li> <li>– Perform all operations safely.</li> </ul>	
<b>Frequency</b>	
Perform snow and ice control work as soon as weather conditions deteriorate and roads are in an unsafe condition.	
<b>Acceptance</b>	
This work is considered acceptable when roads remain open to use by customary vehicle.	

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Washout Repair</b>	
Activity Code 72	
<b>Description</b>	
This activity consists of repairing road damage caused by heavy rainstorm and runoffs.	
<b>Purpose</b>	
The purpose of this activity is to keep roads open and safe for the traveling public.	
<b>Procedures</b>	
<ul style="list-style-type: none"> <li>– Post appropriate work zone and warning traffic control signs in accordance with MUTCD. Close the road and detour traffic if necessary until repairs can be made.</li> <li>– <b>Paved Roads:</b> Repairs include road surface cleaning; removing and disposing of debris; repair or replacement of drainage structures, aggregate base and asphalt pavement materials; and rebuilding road embankment and drainage. The as-built drawings should be used for guidance for dimensions and elevations. Seek technical assistance from the Regional DOT office if damages are extensive.</li> <li>– <b>Earth/Gravel Roads:</b> Repairs include cleaning, removing and disposing of debris, repair or replacement of drainage structures; gravel replacement; and rebuilding the road embankment. The repair should be to the original condition of the road. Obtain archeological and environmental clearances and other permits necessary for major damage repair. Assure work is performed in conformance with applicable federal laws and tribal codes.</li> </ul>	
<b>Frequency</b>	
Inspect known problem areas after major weather events which could affect the road. Inspect roads in areas which have suffered from major weather events.	
<b>Acceptance</b>	
This work is considered acceptable when traffic is promptly and properly warned of hazardous conditions; when that traffic is properly managed to minimize inconvenience to traveling public and when repairs are properly made as soon as funding allows.	

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Slide Repair</b>	
Activity Code 73	
<b>Description</b>	
This activity consists of removing earth and rock slide materials fallen onto the traveled roadway as well as repairing and stabilizing the slope as necessary to assure safe use of the road.	
<b>Purpose</b>	
The purpose of this activity is to open the road to traffic by removing slide material obstructing the road and stabilizing the slope to prevent recurrence slide.	
<b>Procedures</b>	
<ul style="list-style-type: none"> <li>– Post appropriate work zone and warning traffic control signs in accordance with MUTCD.</li> <li>– Close the road and detour traffic if necessary until repairs can be made.</li> <li>– Remove earth and rock using heavy equipment, power broom, and hand tools. Debris from the slide area will be properly disposed or placed where it will not constitute a safety hazard.</li> <li>– The back slopes and ditches will be shaped to the original conditions. Request technical assistance concerning stabilizing the slope.</li> </ul>	
<b>Frequency</b>	
Inspect areas known for slides after major weather events which could affect the road. Inspect roads for slides in areas which have suffered from major weather events.	
<b>Acceptance</b>	
This work is considered acceptable when traffic is promptly and properly warned of hazardous Conditions; when that traffic is properly managed to minimize inconvenience to traveling public; and when repairs are properly made as soon as funding allows.	

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Disaster Response</b>	
Activity Code 74	
<b>Description</b>	<p>This activity consists of the road maintenance program responding to disasters. Disasters will be in two categories; natural and man-made.</p> <ul style="list-style-type: none"> <li>▪ Natural Disasters - heavy snow storms, floods, tornados, earthquakes, wild fires, drought, unusually heavy or high intensity rain fall, rock slides, washouts, extreme mud, extreme dust storms, shifting sand dunes, and floods.</li> <li>▪ Manmade Disasters - vehicle accidents, semi-tractor trailer accident, chemical spillages, petroleum products spillage, leaking underground storage tanks, down electrical lines, explosive spills and exposures, radioactivity leakage and exposure, dangerous chemicals and corrosive spillage, toxic gas leakage from spillage, fire and smoke hazards, illegal drug passage (when Interstate or other arterials are closed down), search and rescue efforts.</li> </ul>
<b>Purpose</b>	<p>The purpose of this activity is to respond safely and responsibly to disasters in order to protect the public.</p>
<b>Procedures</b>	<ul style="list-style-type: none"> <li>– Follow Standard Operating Procedures (SOP) for the road maintenance program to respond to such emergencies. The procedures and plans outline contact persons, emergency response team members, hazardous material operations guidelines, and snow removal &amp; ice control plans.</li> <li>– Others not identified in the SOP will be handled by the Incident Commanders. Agency and Regional Offices will follow their Continuity of Operations Plans (COOP).</li> </ul>
<b>Frequency</b>	<p>Disaster response will be performed as necessary.</p>
<b>Acceptance</b>	<p>This work is considered acceptable when all protocol, procedures, and documented plans are followed, so as to safely minimize the danger to the public presented by the disaster.</p>

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Shop Building Maintenance</b>	
Activity Code 80	
<b>Description</b>	<p>This activity consists of work necessary to keep the facility safe and functional.</p> <p>This work should only be performed in accordance with lease or rental requirements.</p> <p>This work should be performed by licensed professionals as appropriate.</p>
<b>Purpose</b>	<p>The purpose of this activity is to keep the shop and maintenance yard clean and safe.</p>
<b>Procedures</b>	<ul style="list-style-type: none"> <li>– Inspect shop building and clean cluttered and dirty areas. Remove and properly dispose debris and trash.</li> <li>– Repair, or cause to be repaired broken windows, floor drains, flooring, electrical system, HVAC, overhead doors, etc.</li> <li>– Request that Safety Officer inspect premises to assure safety requirements are met.</li> <li>– Inspect maintenance yard and clean debris and trash.</li> <li>– Repair fence, gate, lighting, etc.</li> <li>– Inspect fuel storage area.</li> <li>– Clean up any spills or leaks in accordance with SOP and SPCC; notify proper official of large spill or leak.</li> <li>– Repair secondary containment, clean sump and dispose material properly.</li> <li>– Request that environmental services inspect fuel storage areas to assure regulatory compliance.</li> </ul>
<b>Frequency</b>	<p>Inspect shop building, maintenance yard, and storage areas daily for cleanliness, possible safety hazards, and regulatory compliance.</p>
<b>Acceptance</b>	<p>This work is considered acceptable when shop and yard are clean; known deficiencies and safety hazards have been corrected; and fuel storage areas are in compliance.</p>

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Equipment Service - PM</b>	
Activity Code 81	
<b>Description</b>	
This activity consists of scheduled inspections, recording, and performing preventive maintenance (PM) on heavy and industrial equipment.	
<b>Purpose</b>	
The purpose of this activity is to extend the service life of the equipment and assure that it is safe to use.	
<b>Procedures</b>	
<ul style="list-style-type: none"> <li>– Inspection and PM on equipment includes general condition, all fluid levels, instrumentation, etc., according to the manufacturer's operators manual.</li> <li>– Work is limited to changing oil, lubricating components, and wash down.</li> </ul>	
<b>Frequency</b>	
Inspect equipment before each use to assure it is in safe operating condition. Perform a walk around' inspection. Perform 'in depth' inspection on a fixed schedule Change oil, lubricate, and wash equipment according to schedule or as noted in inspection report.	
<b>Acceptance</b>	
This work is considered acceptable when inspections and work are performed according to schedule and down time due to equipment break downs is limited.	



<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Equipment Repair - Minor</b>	
Activity Code 82	
<b>Description</b>	<p>This activity consists of performing minor repairs of equipment used on road maintenance activities.</p> <p>Minor repairs are considered to be on a level with spark plug and fan belt replacement</p>
<b>Purpose</b>	<p>The purpose of this activity is to keep equipment functioning.</p>
<b>Procedures</b>	<ul style="list-style-type: none"> <li>– Equipment repairs will be made in accordance with all safety requirements stated in the operator's manual.</li> <li>– Each identified repair item will be documented in the equipment life folder in order to track and account for all expenditures made for the operation of the piece of equipment.</li> </ul>
<b>Frequency</b>	<p>Minor repairs will be made as recommended by the manufacturer.</p>
<b>Acceptance</b>	<p>This work is considered acceptable when repairs are made according manufacturer's recommendations and down time due to equipment break downs is limited.</p>

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Equipment Repair - Major</b>	
Activity Code 83	
<b>Description</b>	<p>This activity consists of performing, or causing to be performed, major repairs of equipment used on road maintenance activities.</p> <p>Major repairs are considered to be on a level with overhauls, engine replacement, transmission replacement, etc</p>
<b>Purpose</b>	<p>The purpose of this activity is to keep equipment functioning and extend its service life.</p>
<b>Procedures</b>	<ul style="list-style-type: none"> <li>– Equipment repairs will be made in accordance with all safety requirements stated in the operator's manual.</li> <li>– Each identified repair item will be documented in the equipment life folder in order to track and account for all expenditures made for the operation of the piece of equipment.</li> <li>– Repairs will be made by licensed or certified professionals.</li> </ul>
<b>Frequency</b>	<p>Major repairs will be made as recommended by the manufacturer and as necessitated by equipment usage.</p>
<b>Acceptance</b>	<p>This work is considered acceptable when repairs are made according manufacturer's recommendations and down time due to equipment break downs is limited.</p>

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Equipment Acquisition</b>	
Activity Code 84	
<b>Description</b>	This activity consists of time associated with acquiring equipment. This can include researching sources to find equipment, trips to auctions, trips to view demonstration work, time invested in developing the solicitation, and retrieval of the equipment after purchase.
<b>Purpose</b>	The purpose of this activity is to acquire equipment necessary to perform required work at an cost that is advantageous to the Government.
<b>Procedures</b>	<ul style="list-style-type: none"> <li>– When it is determined that a piece of equipment will be needed relatively soon, either to replace existing piece or to perform additional or different work, check out equipment sources, review excess equipment sale/auction advertisements, GSA list, etc.</li> <li>– Compare condition and prices to determine best purchase.</li> <li>– Follow acquisition policy and procedure.</li> </ul>
<b>Frequency</b>	Acquire equipment as necessary and funding allows.
<b>Acceptance</b>	This is acceptable when the most cost effective purchase has been made in compliance with policy.

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Training</b>	
Activity Code 91	
<b>Description</b>	
This activity consists of attending training as identified in the Individual Development Plan (IDP). All time associated with the training is included; travel, attendance in class, etc	
<b>Purpose</b>	
The purpose of the activity is to assure that employees receive the training necessary to remain current in their profession and are capable of performing in a knowledgeable and safe manner.	
<b>Procedures</b>	
<ul style="list-style-type: none"> <li>– Be familiar with job requirements.</li> <li>– Request training that is necessary to do the job properly.</li> <li>– Attend promptly and participate fully in all sessions of the training.</li> </ul>	
<b>Frequency</b>	
Attend training as identified in the IDP and as funding allows.	
<b>Acceptance</b>	
This work is acceptable when the employee has successfully attended job related training.	

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Permit Inspection</b>	
Activity Code 92	
<b>Description</b>	
This activity consists of work associated with the issuing and compliance inspection of permits. This includes oversize vehicle permits, driveway permits, utility permits, etc.	
<b>Purpose</b>	
The purpose of this activity is to issue permits to assure that oversized vehicles traveling over BIA roads are identified and re-routed when necessary; that driveways are constructed in accordance with AASHTO, environmental, and archeological requirements; and that utility installation is identified and properly performed.	
<b>Procedures</b>	
<ul style="list-style-type: none"> <li>– Review all permit applications submitted for accuracy and completeness. Return as necessary until an acceptable application is submitted. Fill out permit and obtain authorized signature.</li> <li>– Return permit to permittee with a copy to the appropriate Agency.</li> <li>– Oversize vehicle inspection is a law enforcement duty; do not inspect oversize vehicles.</li> <li>– Inspect driveway construction and utility installation as requested.</li> <li>– Notify permittee and proper authority of non-compliance issues.</li> <li>– Document the inspections and keep a record of all correspondence.</li> </ul>	
<b>Frequency</b>	
Perform this work as necessary to facilitate safe use of BIA roads.	
<b>Acceptance</b>	
This work is acceptable when all permits issued are in a timely manner and suit local conditions. Inspections should be performed promptly and issues of non-compliance addressed immediately.	

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Contract Monitoring</b>	
Activity Code 93	
<b>Description</b>	This activity consists of performing some level of contract administration on a road maintenance contract.
<b>Purpose</b>	The purpose of this activity is to assure that contract requirements are met in the performance of contract work.
<b>Procedures</b>	<ul style="list-style-type: none"> <li>– Review the letter of designation from the Contracting Officer to assure knowledge of your duties and responsibilities.</li> <li>– Review contract plans and specifications to assure knowledge of work and applicable specifications under the contract.</li> <li>– Familiarize yourself with project site(s).</li> <li>– Perform contract administration as required. Fully document all inspections.</li> <li>– Notify Contractor and appropriate authority of issues of non-compliance.</li> </ul>
<b>Frequency</b>	Perform contract administration duties as required by type of project and work.
<b>Acceptance</b>	This work is considered acceptable when contract work is performed in compliance with contract requirements, payments are made on time, and project is successfully completed.

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>General Operations</b>	
Activity Code 94	
<b>Description</b>	<p>This activity consists of everything not identified under another activity code.</p> <p>This includes safety meetings, physicals, random drug testing, attending Agency Roads Committee meetings, filling out reports, compiling data, informational meetings, work involved in competitive sourcing process, project scoping meetings, project design plans-in-hand and technical reviews, etc.</p>
<b>Purpose</b>	<p>The purpose of this activity is to account for all other work performed for the road maintenance program.</p>
<b>Procedures</b>	<ul style="list-style-type: none"> <li>– Assure that work you plan to perform under this activity code is an authorized activity.</li> </ul>
<b>Frequency</b>	<p>Perform as necessary to meet requirements of your position.</p>
<b>Acceptance</b>	<p>N/A</p>

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Maintenance Management System</b>	
Activity Code 95	
<b>Description</b>	This is RESERVED pending development of the IRR TFMMS
<b>Purpose</b>	
<b>Procedures</b>	
<b>Frequency</b>	
<b>Acceptance</b>	



<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Work for Others</b>	
Activity Code 96	
<b>Purpose</b>	
The purpose of this activity is to cooperate with others in accomplishing the goals and mission of the BIA.	
<b>Procedures</b>	
<ul style="list-style-type: none"> <li>– Familiarize yourself with the agreement or understanding and the Tribal Resolution approving the work.</li> <li>– Fully understand the work required and all applicable laws, regulations, tribal codes that could be involved.</li> <li>– Schedule the work in coordination with cooperating parties.</li> <li>– Perform the work in accordance with the agreement and schedule.</li> </ul>	
<b>Frequency</b>	
Perform as necessary to meet the terms of the agreement.	
<b>Acceptance</b>	
This work is considered acceptable when it is successfully accomplished on schedule and in accordance with the terms of the agreement.	

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Travel Time</b>	
Activity Code 97	
<b>Description</b>	
This work consists solely of accounting for travel time to and from duty station to actual work site.	
<b>Purpose</b>	
The purpose of this activity is to account for the time it takes to travel to and from the work site, as opposed to the time it takes to perform the actual work.	
<b>Procedures</b>	
<ul style="list-style-type: none"> <li>– Note and record time you leave duty station and time you arrive at job site.</li> <li>– Note and record time you leave job site and time you arrive at duty station.</li> </ul>	
<b>Frequency</b>	
Travel as needed to get to job site.	
<b>Acceptance</b>	
This work is considered acceptable when time is recorded promptly and accurately.	

<b>Bureau of Indian Affairs - Maintenance General Guidelines</b>	
<b>Furlough</b> Activity Code 98	
<b>Description</b>	This activity consists of time spent on official furlough from your job.
<b>Purpose</b>	The purpose of this activity is to furlough employees in order to meet FTE ceiling and budget needs.
<b>Procedures</b>	<ul style="list-style-type: none"> <li>– Go on furlough as directed.</li> </ul>
<b>Frequency</b>	Generally an employee is furloughed when his services are not required.
<b>Acceptance</b>	This is considered acceptable when furlough time is recorded accurately and employee goes on, and returns from, furlough as scheduled.

## **11. SNOW AND ICE CONTROL**

### **11.1. Introduction.**

11.1.1. Operations. The removal of snow and ice from the highway is extremely important and takes precedence over all non-emergency work. The roadway should be plowed, sanded, or de-iced if necessary, and widened to allow traffic as quickly and safely as possible. The snow removal operation is intended to provide the prudent motorist with a reasonably safe driving surface. Each Region should develop guidelines establishing when to commence snow removal operations and a list of prioritized roadways (see Section 11.2 below).

Planning and preparing for winter operations, if done properly, will make snow and ice control efforts more efficient and effective. During the winter season, there are many times when the snow is falling faster than the plows can clear the highways. Also, snow removal and ice control efficiency is related directly to staffing levels and the ability to keep equipment in use on the roadway. Economy and efficiency of operation is the goal of all maintenance personnel.

Removal of the normal snowfall and windrows of plowed snow on private road approaches and driveways, both on and off the highway right-of-ways, is the responsibility of the property owner. The removal of snow by Bureau forces except in emergencies is confined to the limits of the right-of-way. All emergencies should be documented with signed approval given by the Authorized Officer in Charge. Work performed under a declared "State of Emergency" should be approved by the Authorized Officer in Charge and should be confined to strictly emergency operations which employees are qualified to perform.

#### **11.1.2. Safety.**

11.1.2.1. Personnel. Include safety awareness in all maintenance training programs. Having a well trained snow and ice control workforce is beneficial in many ways, such as less downtime of equipment. Seasoned operators make fewer mistakes and errors in judgment than less-trained operators, thus causing fewer accidents and injuries and less damage to roadside features. Knowing how to handle potential medical emergencies and treatments plus recognizing fatigue and length of duty issues is very important. Maintenance operations require employees to be on the alert to protect themselves, fellow crew members and the traveling public. Performing jobs safely is a priority and an integral part of maintenance operations.

- 11.1.2.2. Equipment. Develop guidelines for the various snow / ice control procedures, including safety measures for mounting plowing and spreading equipment; mounting tire chains; plowing procedures; using wing plows; storing and handling of materials; safe operating condition of equipment; communicating in emergency situations; safety chains; chocking and blocking and warning lights on snow and ice control vehicles. Get all materials, equipment and parts ready for the first winter event. This includes snowplowing, anti-icing, sanding, de-icing, and radio equipment, de-icing / sanding materials, and supplies including signs, flags, barricades, and small tools. Don't be caught unprepared for an early snow. Vehicles requiring maintenance should be repaired as soon as possible. Have a system in place to determine the severity of the defect(s), and the importance of the equipment to the snow and ice control. Prioritize the work to correct the most serious maintenance and safety problems first.

## **11.2. Snow and Ice Control Plan.**

- 11.2.1. Operational Plan. Prior to winter operations, update and submit the "Annual Snow and Ice Control Plan" to the Regional Road Engineer for review and approval. Once the plan is approved and signed, forward a copy to the BIA Regional Division of Safety and the Tribal Emergency Management Department. The Reservation Maintenance Organization/Agency Road Maintenance Department should hold a strategy meeting with the appropriate representative(s) to plan how to handle the weather-related emergency events of the coming season. Agencies that furnish services other than snow removal should be included in this planning session also, particularly those with medical, law enforcement, fire fighting, transport and repair service units. The roadway classifications, traffic density (ADT), level of service desired, historical average weather conditions and current forecast, pavement surface types, available work force size, anticipated equipment usage (conditions), terrain, and other pertinent data are discussed for the purpose of establishing a plan of action.

Use large-scale reservation maps with clear overlay sheets to show locations of concern and/or interest throughout the meeting. Identify known trouble spots such as drifting areas, shaded ice and compacted snow areas, steep grades, etc. The wide ranges of ice and snow conditions impose an equally wide range of planning needs.

The following sections are intended to serve as guidelines for the preparation of winter maintenance "events". Providing this information only as guidance, allows each Agency / Reservation to include or otherwise develop guidelines specific to their locations. They are not

required to include all the recommendations within the plan. At the same time the plan is not limited to what is included in the guidelines.

#### 11.2.2. Objectives.

- 11.2.2.1. Identify the primary functions of snow / ice removal;
- 11.2.2.2. Provide for adequate snow / ice removal within available resources;
- 11.2.2.3. Provide a reference for all personnel on the policies and procedures of snow/ice control;
- 11.2.2.4. Establish communication for public inquiries to ensure understanding of the capabilities and limitations of the snow and ice control policies;
- 11.2.2.5. Protect the environment through wise use of chemicals and abrasives to minimize the impact on soil, vegetation, water, animals and infrastructures. Review environmental documentation for the road and obtain local and tribal approval prior to using chemicals or abrasives.

#### 11.2.3. Operating System.

- 11.2.3.1. Bureau Policy Position Statement and Guidelines: The plan should include all Bureau / Region / Agency / Reservation policy position statements and guidelines regarding snow and ice control.
- 11.2.3.2. Personnel Functions: Specific tasks that should be accomplished during any snow emergency should be pre-assigned to various trained personnel. The operational plan should list duties for all classifications of personnel involved in snow and ice control, including those from other offices / branches. In addition, all split shifts and night patrols should be defined and duties assigned. Do not work employees outside of the Position Description or in activities for which they are not fully trained and qualified.
- 11.2.3.3. Communications: An efficient and effective communication system is a crucial component in a successful snow and ice control operational plan. The plan should identify who is responsible for the coordination and preparation of Weather and Road conditions progress report. In addition, a system for notifying employees of a “snow event” should be developed and included in the plan. A process for reporting mechanical

failures or difficulties or obtaining emergency parts during non-working hours should be in place and included with the plan.

11.2.4. Priorities. The Branch of Engineering and Operations is recommended to develop quality performance measurements for snow and ice control. These performance measurements will be established to assess how well Agencies are able to respond to situations concerning snow / ice control. The purpose is to find the best ways to do our jobs with reduced funding and personnel. Because of the need for continued mobility and safety on the roads, it is important that the program addresses not only satisfaction for the traveling public but how to attain that within the available budget and resources. These measures focus on providing targeted levels of service for snow and ice control based on functional classifications and local maintenance area priority. Priorities of routes are to be based on traffic volume and functional importance of the route in the overall reservation transportation system and should be addressed in the “Annual Snow and Ice Control Plan.”

11.2.4.1. Priority Identification.

- Traffic Volume
- Functional Classification of roadway
- Bridge deck and approaches
- Known problem areas
- Transit routes
- School bus routes
- Medical, fire and police
- Hills, curves, and intersections

First priority routes are transportation facilities of major importance and high traffic volume which should be kept open to traffic at all times. Second priority routes are those only slightly less important than first priority routes, such as school bus routes and primary roads not included in the first group. These routes are covered as quickly and as frequently as conditions will permit. Third priority routes are of less importance due to traffic volume, construction and location. Required to be kept passable only for vehicles with tire chains, these roads receive attention only after all second priority roads have been covered. Fourth priority routes are those routes with infrequent traffic volumes serving farming and recreational areas. These routes may be closed during moderate to heavy snowstorms.

11.2.4.2. Snow and Ice Control Service Level (SICSL). Snow and Ice Control Service Level refers to regional operational guidelines establishing maintenance activities associated with the

prevention and removal of snow and ice from roadways. SICSL defines how clear the surfaces should be kept and when the action is to be taken. For plowing and sanding activities the recommended levels of service to be approved by the Regional Office, and as funding allows, are as follows:

*Priority Level (1)* Remove snow continually during the storm event to keep the roads open to traffic and provide a reasonable surface on which to operate. Keep at least one lane in each direction open during the storm. All sections will have an application of ice control materials with a plowing frequency for a full bare roadway width to avoid a snow accumulation not to exceed one and one-half (1.5) inches within three (3) hours after beginning of the “event,” if practical.

*Priority Level (2)* Remove snow during storm to keep roads open to traffic, except when blizzard, avalanche, or other severe forms of weather make conditions such that maintenance and motor vehicle operators cannot reasonably negotiate the travel-way. Snow pack left by plows does not need to be removed until thawing conditions exist, or the pack becomes so thick as to create a traffic hazard when it thaws. All sections will have an application of ice control materials with a plowing frequency for a full bare roadway width to avoid snow accumulation not to exceed (2) two inches within (4) four hours after the beginning of the storm, if realistic. When effective, apply chemicals or abrasives, separately or combined, to enhance traffic safety on steep grades, sharp curves, bridge decks and approaches, or intersections that have historically been known as high accident locations. Gravel surface roadways will not be plowed to the surfacing for the full roadway width to retain the surfacing materials.

*Priority Level (3)* When manpower and equipment are available, remove snow during the storm to keep the roads open to traffic. All sections will have an application of ice control materials with a plowing frequency for single bare centerline lane to avoid snow accumulation not to exceed (3) three inches within (12) twelve hours after the beginning of the “event,” if appropriate. Reduced service may be in effect from 8 p.m. – 4 a.m. weekdays and all day Saturday and Sunday. Additional snow removal should be accomplished during regular working hours. Usually, chemicals and abrasives are not used, but may be applied at specific locations under unique or extraordinary circumstances.



*Priority Level (4)* Remove snow during the storm when manpower and equipment are not being utilized to clear other routes. These routes may be closed for an extended period of time until resources are available to plow the travel-way. Since these routes often receive attention only after a storm is over and are then kept passable only for traffic with chains, persons living along these routes should take the necessary precautions. Chemicals and / or abrasives are not used; if surface condition becomes too hazardous for traffic to reasonably negotiate, the section should be closed.

Agency guidelines should also contain procedures for temporary closures of roads in special locations such as mountain passes, steep inclines and sparsely populated areas. Such closures should be approved by the Authorized Officer in Charge, and closed and signed in accordance with MUTCD. The public should be adequately notified of the closure.

### **11.3. Equipment.**

#### **11.3.1. Vehicles.**

- 11.3.1.1. Types. A variety of snow and ice patrol equipment is used across the country, depending on many factors including climate and type of area (mountainous, flat, rolling, etc.). The most common types are trucks, plows (front mounts, wing and under-body), material spreaders, wheel loaders, motor graders, snow blowers or rotary plows, sweepers (pick-up and broom), and melters (for melting hauled snow and ice). The nature and range of tasks the equipment will be performing and the environment in which it will be operating determine selection of the appropriate equipment. In some heavy snowfall locations, snow and ice control operations are the primary function of the equipment. In these cases, the equipment should be designed to perform this difficult function over much of its service life. In lighter snowfall areas, snow and ice control operations may only be incidental to other functions performed by the equipment, such as hauling equipment and personnel for non-snow and ice-control highway maintenance activities. The key to successful equipment utilization is to balance the design so that even the least common tasks can be accomplished adequately. By choosing multipurpose equipment wisely, an agency can usually optimize its equipment budget. An agency should consider both functional and technical specifications when acquiring snow / ice equipment.

Functional specifications are primarily performance based, including load-carrying capacity, stopping distance under various load conditions, maximum speed up certain inclines while loaded and equivalent performance relative to a particular manufacturer and model. This type of specification places liability and responsibility on the manufacturer or supplier.

Technical specifications stipulate particular components of the equipment (e.g., the hydraulic line should be 3/8" inside diameter, constructed of stainless steel, and have a 1000 psi pressure rating). When requesting this type of specification the purchaser assumes most of the liability and responsibility. Two specification types can be mixed and matched to guarantee that the equipment ordered will provide the most benefit for the specific requirements.

- 11.3.1.2. Maintenance. Operators should regularly use checklists to inspect equipment and vehicles for defects and maintenance problems requiring immediate correction. Establish a system for identifying, scheduling, and documenting the performance of routine maintenance procedures for any size mobile snow and ice fleet. Snow / ice control equipment operates in a very difficult environment. Most equipment is diesel powered, which does not start well in cold weather. Storing equipment in heated spaces will help cold weather starting. If storage is not possible, electrical outlets should be provided for engine block heaters to help with the cold weather start-ups. Cold weather, a corrosive environment, impact loadings, over-loadings and increased potential for collisions with other vehicles or roadside features are some of the factors that increase equipment stress. As a result, particular attention has to be given to maintaining and repairing snow / ice equipment. The routine maintenance schedule recommended by the equipment manufacturer should be regarded as the absolute minimum requirement for servicing equipment. A thorough inspection and repair of equipment, if needed, prior to and after each snow and ice "event" should be performed. In addition, a thorough cleaning, repair welding, repainting and lubricating of equipment is essential at winter's end.

Snow and ice control equipment sometimes needs field servicing / repair to maximize up time. If the problem is relatively minor and can be corrected in the field, a mobile field service truck and qualified mechanic will expedite repair and minimize downtime. A tow truck capable of removing stuck or disabled equipment that may impede snow and ice

operations should identified. Trucks should be stabilized with chocks, tire chains and abrasives. Pulling the vehicles to a cleared area for final hook-up and removal is often required.

Snow / ice control equipment should be washed frequently to improve operating efficiency, and extend its useful life. Washing facilities should be designed to minimize environmental impact. Agencies should consider sharing of equipment washing facilities with other municipalities to minimize costs and adverse environmental consequences. The use of commercial equipment washing facilities, such as truck washing business, should be considered since they are responsible for wash water collection disposal.

11.3.1.3. Supplies. Operators should always carry a minimum of safety gear with their equipment including:

- fire extinguisher
- hard hat
- safety vest / traffic control flags
- ear protection
- flares
- triangles
- flashlights
- leather gloves / foul weather gear
- safety goggles
- basic tools
- first-aid kit
- tow chains
- tire chains
- shovels / pry bar
- brooms
- window scrapers
- pen / pencil and pad
- large, clearly labeled and weather protected map of plowing / sanding route that includes location specific operation details.

**11.4. Materials.** The use of chemicals and abrasives for snow / ice control operations represents a major expenditure area for many highway agencies. Expenditures for sand and other abrasives account for more than 10% of maintenance budgets, excluding the cost of application and clean up. The use of these materials is expensive in terms of damage to the infrastructure and motor vehicles, harmful effects on the natural environment along the roadway, and additional highway cleanup operations. Sanding material and anti / de-icing materials should be applied with discrimination, consistent with the environment, climatic, meteorological, and traffic conditions. The surfaces of certain highway system locations, particularly bridge decks, cold spots, shaded areas, spots and moist

areas, become slippery earlier than surrounding areas. If the potential for such danger is high, one of the most cost-effective treatments is to apply liquid snow and ice control chemicals to these locations in advance of the event. The treatment will remain effective for several days depending on the rate of dilution and “event” temperature characteristics.

#### 11.4.1 Chemicals. Review environmental documentation for the road and obtain local and tribal approval prior to using chemicals.

The use of materials should be specified considering the variables, including type of precipitation, temperature, temperature forecast, percentage mix (salt / sand), classification of roadway, and location (intersection, hill, etc.). Most of the maintenance actions involve the application of a chemical in either a dry solid, liquid, or pre-wetted solid form. The first treatment for most storms is to spread an ice control chemical to prevent snow or ice from bonding to the pavement. Anti-icing is to prevent the bonding of snow and ice with the pavement surface through timely application of a chemical freezing point depressant. In contrast, the objective of de-icing is to destroy the bond between snow and ice and the pavement surface by chemical or physical means, or more likely, a combination of the two. De-icing operations are commonly initiated only after an inch or more of snow has accumulated on the pavement. These operations are often more costly and provide less safety. Occasionally de-icing may require large amounts of abrasives and chemicals to temporarily increase traction levels and destroy or weaken the bond of packed snow. Anti-icing requires about one-fifth (1/5) the amount of chemical to prevent a bond from forming compared to the amount required to destroy the bond. Salt (sodium chloride), has been and still remains the most commonly used chemical for snow / ice control. Salt is widely used because of its effectiveness at moderate subfreezing temperatures, relatively low cost, availability and ease of application in the solid form with current spreader equipment. At pavement temperatures above 20°F (-7°C), salt is effective for combating ice and light snow and greatly enhances the effectiveness of plowing under heavy snow conditions. Many chemicals have been considered and tried for combined snow and ice control with some degree of success. The five chemicals that have been used most commonly for roadway anti-icing and de-icing treatments are sodium chloride, calcium chloride, magnesium chloride, calcium magnesium acetate (CMA), and potassium acetate (KA). Dry chemicals are applied to the roadway mainly by means of a hopper type spreader or a dump body with an under tailgate spreader. These devices are capable of spreading free-flowing granular material (including salt, abrasives and sand / salt mixtures) over a width ranging from three feet (1m) to forty feet (12m). Both hopper and tailgate spreaders have been used successfully during de-icing and anti-icing operations. Control of material application rates from both types can be accomplished manually by operators, or automatically relative to the vehicle’s speed. Zero

velocity spreaders are becoming more popular with maintenance forces. These spreaders distribute solid chemicals from the rear of the truck and place material on the pavement at near zero velocity relative to the road surface. This feature helps prevent the loss of material from the pavement caused by particle bounce from a spinner-disk distributor or truck speed. Zero velocity spreaders can be made in either a hopper or tailgate configuration. Regardless of the type of spreader used for snow and ice control operations, it is extremely important to calibrate it to ensure that the desired quantity of material is actually being applied. Calibrate each spreader to make the spreads required at a reasonable speed. Different drivers typically operate the same piece of equipment during the winter months. Some drivers may not be familiar with the specifications of a particular vehicle or piece of equipment. It may be useful to post a card in the cab of each vehicle showing the truck speed or tachometer reading and adjustment to the spreader to deliver specified spread. Variations from this calibrated rate may be necessary in accordance with actual field conditions.

There are two most common types of liquid application equipment for highway use. One type uses spinners consisting of either multiple rotating disks or a single disk. The other type uses nozzles on a distributor bar. Either system can be chassis-mounted; a slip-in unit that can be placed temporarily on the bed or frame of a dump truck and removed during the off-season, or it can be a trailer or tow-behind unit. Liquid spreaders are better suited for anti-icing than de-icing operations, but there is not enough accurate information to suggest which type of liquid spreader is the most reliable or effective for anti-icing operations. General experience has shown that liquid chemicals can be successfully applied at speeds up to 25 to 35 mph (40 to 55 km/h) for spinner type spreaders and at speeds of 40 to 50 mph (65-80 km/h) for spray-bar type applicators. Again it is extremely important to calibrate liquid spreaders to ensure that the desired quantity of liquid is being applied. Nozzles and filters need to be checked frequently during usage for function and output. Changes in setting may be required as a result of wear on mechanical linkages, components and hydraulic systems. It is a good practice to perform calibration periodically during the winter months.

Sodium chloride, road or rock salt has been the solid material most commonly used when applying pre-wetted chemicals in both anti-icing and de-icing operations. Pre-wetting solutions can be made from sodium chloride, calcium chloride, magnesium chloride, potassium acetate, or CMA. Water alone has been used as a pre-wetting agent, but only when used at higher temperatures. Pre-wetting of a solid chemical can improve the effectiveness of the solid in many ways. Advantages of pre-wetting include:

- Liquid added to the solid chemical surface accelerates the solution's generation process;
- A tendency towards less waste of pre-wetted materials; because the solid adheres to the road surface better
- Faster effect of the chemical;
- Increased spreading speed in some circumstances.

Pre-wetting can be accomplished by one of three methods: 1) a pre-wetting chemical can be injected into the material stockpile at a specified quantity; 2) a liquid chemical can be sprayed onto a loaded spreader or on the material as it is being loaded into the hopper; 3) an on-board spray system mounted either on the spreader or dump truck can add a liquid chemical at the time of spreading. When on-board pre-wetting systems are used, periodic inspections of the solid material being dispensed should be conducted to make certain that the desired amount of mixture / material is being applied. Review environmental documentation for the road and obtain local and tribal approval prior to using abrasives.

11.4.2 Abrasives. Abrasives are used primarily during snow / ice control operations to improve traction. Such improvement may be short lived and its duration depends on factors such as storm type, pavement condition and type, and traffic conditions. Abrasives are usually mixed with salt or other chemicals to prevent stockpiles from freezing, keep truck / hopper loads flowable, and “stick” the abrasives to the snow / ice surface. Abrasives are primarily used for treating snow-packed and icy roads in rural areas. They are also used on all types of roads when pavement temperatures are too low for chemical treatments to be effective. The specifications for abrasive material should contain a minimum, the acceptable particle size gradation range. The maximum aggregate size should be limited to 0.5 inches (1.3cm) to reduce damage to vehicles and injury to pedestrians. Specifications for abrasive materials should also include the following desirable properties: 1) resistance to crushing, impact, and grinding by traffic; 2) angular particle shape to reduce blow-off from the roadway and improve skid resistance; 3) dark color to absorb heat to aid in ice melting and thereby reducing blow-off and 4) maximum limits on flat and elongated particles. Remember, abrasives are not snow / ice control chemicals and will neither prevent nor destroy the bond between pavement and ice which is the fundamental objective of anti-icing and de-icing efforts. The advantages and disadvantages of abrasives should be understood. Advantages include lower initial costs; some immediate, although temporary, increased traction or slippery surfaces; potential usage at low temperatures when some chemicals are ineffective; and visible evidence of road crew actions. Disadvantages include frequent reloading of material due to short distance coverage per truckload; reapplication required due to traffic and precipitation; adverse effects on cars such as damage to windshields and body finishes; significant cleanup efforts of roads and drainages following “events” and the winter season;

adverse affects on the air quality through the increased airborne particles; and adverse affects on watercourse ecosystems.

11.4.3 Storage .Proper storage, handling and inventory control of abrasives and chemicals are critical to an efficient snow / ice control operation. Two types of snow and ice control materials are stored at maintenance facilities: abrasives and chemicals. The decision whether to use inside or outside storage facilities depends on the solution and the lowest air temperature expected. If the lowest air temperature is at or below the freeing point of the solution, then inside storage should be used. If that is not possible, heat can be applied either with heat tapes or immersion heaters in the outside storage container to maintain the solution temperature above the freezing point. Chemicals can be either in liquid or solid form. Liquid chemicals are stored in tanks. Many types of barns or silos are in use for solid chemical storage, ranging from a simple roof over a stockpile to a complete building. The type and kind of storage vessel depends on the solution it contains and whether a secondary containment (e.g., double-walled tank or containment dike) is used. Solid chemicals should be stored inside a building or under a moisture-proof cover, preferably on an impermeable pad. Bulk chemicals should have the first priority for inside storage. Chemicals stored in the open pick up moisture; produce a leaching that drains into watercourses and aquifers; and develop an outer crust that has to be wasted or reprocessed. Drainage from the area should be designed to divert runoff away from the structure or covered pile and to collect any contaminated material. Solid chemicals shipped in bags should be stored in a dry place, preferably in an enclosed building. Storage for more than one year is not recommended.

Abrasives are normally treated with salt to prevent freezing in storage; to maintain flowability in the spreading truck; and to help keep the material on the road surface when spread. Normally, treated abrasives, or winter sand as it is sometimes called, containing 3% to 5% salt will provide a free flowing condition for distribution. The salt content of stockpiled winter sand should not exceed 10% by volume, even in the coldest regions, as salt mixtures with higher percentages are seldom used. Excessive handling increases the changes of spillage and degradation to take place, or for unwanted moisture to be picked up by the material. A containment system should be constructed around the loading area to receive and collect any brine runoff from the loading operations.

## **11.5. Removal and Storage Methods.**

11.5.1. Plowing. The role of snowplowing in either de-icing or anti-icing operations is to remove as much snow and loose ice as possible before applying chemicals. Plowing is all that will be necessary if the pavement and snow are both cold and dry and the snow is not adhering to the pavement. If the plow trucks have spreaders and they are plowing and

spreading simultaneously, they should limit material spreading to the freshly plowed areas of the road. When spreading is performed independent of plowing, plowing operations should immediately precede spreading in order to prevent the chemicals from being plowed off the pavement too early. Generally, snow and ice should be removed to the right from centerline to the shoulder. Plowing from centerline (rather than from the inside wheel path) will minimize the build-up of a packed centerline berm. A centerline berm may prolong icy conditions in the travel lanes during later freeze/thaw cycles and may also create a hazard to vehicles crossing the centerline in each direction. In some urban areas it may be necessary to plow to the center of the road or all to one side for later removal. A two-way plow should be used when moving snow to the center or one side of the roadway. Avoid operating equipment against opposing traffic unless the area is under adequate traffic control. Snow banks that interfere with sight distance, typically at intersections and curves, should be pushed back or removed. Shoulders should be cleared to their full width to accommodate disabled vehicles and provide temporary snow storage during clean up. Areas beyond the shoulders can also be pushed back to accommodate future snow and minimize drift potential. When a thick snow floor builds up under traffic, many times partial melting and / or the use of traction devices will produce a rough, uneven surface. Snowplowing over such a surface can be extremely hazardous and it should be dealt with as soon as resources are available.

There are many types of snowplows. These include one-way front plows, reversible front plows, deformable front moldboard plows, underbody plows, side wing plows, and plows specifically designed for slush removal. Various cutting edges are also available in carbide inserts, steel, synthetic polymers, and rubber. Prepare each roadway for effective plowing by doing the following: 1) keep ditches clean; 2) keep shoulders smooth and flush with the pavement; 3) clean sand out from under the guardrail; 4) cut and remove tall weeds, grass, and brush that may cause snow drifting; 5) clear right-of-way fences of wind-blown weeds and sand drifts; 6) erect snow stakes, if necessary, to indicate hazards or the edge of the roadway which may be covered with snow.

Brooming is another technique for removing snow that is loose or not bonded to the pavement surface. Brooming can clear the surface fairly well and significantly reduce the need for ice control chemicals; however, it will not remove compacted snow / ice and it is most effective on areas that receive little or no traffic between broomings.

Operators need to test-drive their routes prior to actually starting winter operations. Items to be noted and possibly put on a map include:

- Obstacles along the highway (mark them in some way if possible)
- Bridges



- Turn around locations
- Raised features on or along the roadway, including medians, access covers, grates, and speed control bumps, curbs, etc.
- Special plowing situations and ways to deal with them
- Pipes, drainage inlets, box culverts and cattle guards
- Low overhead clearance features, including wires that may sag with a snow or ice load
- Priority treatment locations
- Locations requiring special attention, such as super elevated horizontal curves and sag portions of vertical curves
- Safe havens for use in case of blizzards or whiteout conditions, and
- Public telephone in the event of blizzard or communication failures.
- Locations to push snow off the road in through-cut areas

Plowed snow on bridges requires special attention because it presents a hazard to motorists or fixtures below if snow is plowed off the bridge. Some type of fencing or other containment is usually necessary on bridges over vulnerable features. Sidewalks are another area of concern to the public. Depending on the distance between the highway shoulder and the sidewalk, depositing highway snow on sidewalks can be controlled by limiting plow speed, although it will create higher windrows in driveway openings.

11.5.2. Snow Fences. Snow fences can save lives, reduce maintenance costs and be an economical means of collecting, storing and keeping snow off roadways. Special consideration needs to be given to land requirements for snow fences and the storage of snow behind them. There is a wide choice in fence material depending on considerations of cost, weight, aesthetics, performance and snow load. Most snow fences are constructed of standard, readily available materials. Properly designed and placed, taller fences are dramatically more effective than the traditional low picket fence. Snow fences too close to the road can increase the amount of snow on the road. Although a single tall fence is most efficient, there are situations where multiple rows are necessary, such as for temporary installations where fences are installed and removed on a seasonal basis. Sizing a snow fence is similar to determining the required capacity for a culvert, detention pond, or storm drain. For conventional snow fences to be effective, they should be located at a considerable distance from the area of protection. Certain terrain features, such as a hill, or a gully, may require a fence to be placed farther from the road than the minimum distance. The distance between fences and the road should be at least 35 times the height of the fence. Height is the most important factor in fence design because it has the greatest influence on snow trapping efficiency, storage capacity, and cost. Adding 6 in. (15cm) to a 4 ft. (1.2m) fence increases its capacity by 30%. The fence should extend lengthwise far enough to cover the area to be protected, extended on either side by 20

times the height of the fence. Fences should have a gap at the bottom equal to 10-15% of the total vertical height. Leave 40-50% of the fence surface area open to make the fence porous. Solid fences do not collect snow efficiently. New lightweight plastics now allow the construction of portable fences up to 8 ft. (2.4m) tall. Although fences should be perpendicular to the prevailing wind direction, the angle can vary by as much as 25° (degrees) without affecting performance.

Living snow fences comprised of living plant materials such as grasses, shrubs, and trees can be used to improve driver safety and reduce road closures and maintenance costs. When roads or sections of road are subject to recurring snow blockage due to drifting and blowing snow, well-planned and placed living snow fences can be more cost effective than structural barriers or snow fences. Care should be taken so that vegetation such as grass, forbs, shrubs, and trees don't act as an unplanned living snow fence and deposit drifting or blowing snow over the roadway. In this case, the vegetation may have to be removed or reduced in height to allow the snow to continue to pass over the surface of the road. Living snow fences should be considered in those sections of a road that are subject to continuous drifting snow. Considerable thought and planning should be done in advance before living snow fence can be installed.

## **11.6. Training.**

11.6.1. Purpose. Operators educated in the proper use of equipment, pre- and post-operational inspections and equipment maintenance practices guarantee that equipment has less downtime and lower overall repair costs. There are many ways to conduct effective training. The selection of an appropriate forum and a target audience is based largely on fiscal resources and training objectives. One way to ensure an effective and efficient workforce is to require minimum levels of training, education, and experience. A properly trained snow / ice control workforce uses fewer material, equipment and personnel resources to achieve the proper level of service. Learning the job by actually doing it may be the most common and effective training practice; however, inexperienced staff should be placed under the watchful eye of more experienced crew-members until some basic level of competence is achieved. More experienced workers in the same job classification can train less experienced personnel. This is an effective process, as peers are perceived to be highly credible, particularly when they come from another workplace. This approach also provides a good opportunity for people who have more advanced training to share knowledge. The more extensive the road system, the more people and equipment it will take to provide a level of service equivalent to that required of a smaller system. The features of the system, such as "stop and go" operations, dead ends, cul-de-sacs, turning lanes, ramps, contiguity of the route, grade, and curvature, will impact production rate and therefore have to be considered.

11.6.2. Topics. Training should be provided to both field personnel and decision-makers on the following subjects:

- Agency safety policies
- Equipment operation, inspection and calibration
- Defensive driving techniques
- Route specific issues
- Agency snow and ice control policies and guidelines
- Fundamental snow and ice control concepts
- Agency equipment operation policies
- Environmental concerns and responsibilities
- Operators awareness of physical and mental wellness required during snow removal activities
- Winter survival in open rural country
- Radio and other communications practices
- Legal rights and responsibilities and
- Agency personnel and staffing policies, including drug and alcohol policies.

11.6.3 Snow Rodeos . The snowplow rodeo is not only to train snowplow operators and have friendly competition, but also to inform the public that this activity involves highly skilled, professional employees. Preparation for the competition requires a committee of volunteers to locate and prepare for the event. The committee will need to identify the equipment to be allowed on the course. It can be limited to only 27,500 lbs. (gvw), minimum cab to axle distance of 80 inches and equipped with a minimum of 10 ft. snow plow, either one-way or reversible, and the sand / chemical spreader should be optional. The teams are to be composed of two operators. Teams from other agencies that are involved with snow removal should be invited including county, city, state, and other federal agency maintenance crews. The location will need to be level and preferably a paved parking area larger than 150 ft. by 350 ft. for the obstacle competition. There should be room for competitor's trucks, staging area, written test area, spectator parking, bleachers, sanitary facilities and food section

The competition tests each team in two areas: 1) Written exam to determine the operator's knowledge of safe driving rules and operational procedures. 2) Obstacle course to determine the driving ability of the team when operating the snow removal equipment.

The written test includes a variety of questions made up of multiple choice and true / false questions, to be based on state driving rules and regulations; general questions in the area of mechanical inspection checks that the operator performs on his equipment prior to leaving the yard; safe equipment operation; the Salt Institute's "Sensible Salting" procedures and generally accepted snow removal techniques. Questions on salting

procedures and snow removal techniques have to be general in nature to cover operations from open highways to subdivision streets. Both members of the team take the test and their scores are averaged.

The obstacle course includes eight skill driven procedures plus the overall time it takes to complete the course. Common deductions for each obstacle are: 3 points for jerky movements, 10 points for stopping and 15 points for leaning over the driver's position to view obstacles.

The operator starts at the parked vehicles, proceeds into the outside curve, through the straight line, into the offset alley, through the serpentine, into the alley dock, around the inside curve, through the diminishing clearance and finishes at the stop line.

Starting the course with the driver maneuvering through parked vehicles, this course is designed to determine the driver's ability to plow closely around and between two parked cars without touching them. Two points are deducted for each foot away from the cars or curb, and 20 points are deducted for any and each part of the cars that are hit. The vehicles are spaced 50 feet between the rear of one vehicle and the front of the other.

The outside curve determines the ability of the driver to maintain the right edge of the snow plow within 6 inches of a curb without touching it. Five (5) points are deducted for each foot away from the curb at the markers and 10 points are deducted for hitting the marker. The markers need to be light enough to be seen moving when hit, but not enough to fly away when bumped. The radius of the 180° outside curve is 40 feet.

The straight line determines the ability of the driver to maneuver the snow plow over a straight path. The driver's right wheels should go through the line of markers, with approximately 2" (in.) of clearance on each side of the wheel. Ten (10) points are deducted for hitting a marker. The obstacle is composed of seen pairs of markers at 29" (in.) apart and 20' (ft.) between pairs.

The offset alley tests the driver's ability to maneuver his snow equipment through a tight space. Two (2) sets of barricades approximately 11 feet wide are spaced 32 feet apart. The driver should pass between the first set of barricades, make a partial turn and then continue between the second set. Twenty-five (25) points are deducted for touching a side of the alley and for backing up.

The serpentine tests the ability of the driver to maneuver in crowded situations, such as plowing a cul-de-sac. The obstacle is made up of four drums set 35 feet apart on centers set in the middle of a 20 foot lined lane, ending with a stop line 55 feet from the last drum. The vehicle should be driven past the drums and then backed through them, alternating to the

right of the first drum, left of the second drum, and so forth. Deduction of five (5) points for bumping the barrels, 15 points for going on or outside the lines and 25 points for moving the barrel more than 6 in. or knocking it over.

The alley dock tests the ability of the driver to reverse his snow vehicle into an alley with a loading dock at the end. The obstacle is made of barricades set 12 feet apart and a length of 40 feet with barricades across the end. Ten (10) points are deducted for backing more than twice, 25 points for scraping a barricade, 2 points for stopping each inch over more than 6 inches from the dock, and 35 points for touching the dock.

The inside curve tests the driver's ability to maintain the edge of his snow vehicle's plow within 12 inches of the curb without touching it. Five (5) points are deducted for outside of each foot line at the markers and 10 points for touching the marker. The radius of the 180° curve is 25ft.

The diminishing clearance tests the ability of the driver to steer his snow vehicle through a progressively narrowing space and to judge exactly where the front of his plow is at all times. Fifteen (15) points are deducted for bumping any of the first three (3) pairs of markers and 8 points for either of the last pair. The funnel shape entry clearance width of 11 feet narrows down to a clearance of 9 feet.

The stop line tests the driver's ability to place the left corner of the plow on his snow vehicle within 6 inches of the stop line without going over the line. Two (2) points are deducted for each inch more than 6 inches from the top line and 40 points for stopping beyond the line.

These competitions should be made interesting by setting them in an open-house environment with other activities to keep participants informal and relaxed. They can also be used to evaluate the training program by analyzing and comparing scores in both the field course and written test to identify areas to improve and show successes.

- 11.7. Environmental Considerations.** Contamination of ground water is the largest environmental problem associated with snow / ice control operations. Contamination may occur because of improper storage of chemical stockpiles; runoff from roadway applications; lack of suitable containment during loading of materials; and cleanup / washing equipment. The facility should be capable of disposing of sediment, oil, and ice control chemical solutions to meet local environmental requirements.

Facilities and equipment exposed to corrosive ice control chemicals should be thoroughly washed after each exposure. Bridges and other appurtenances (i.e., guardrails) should be washed at the end of the season and protective coatings such as paint should be applied to all corrosion-sensitive surfaces. Sealant and other

protection should be applied to electrical connections. Where possible, equipment should be re-stored under cover or in a weatherproof facility.

Surface waters can be adversely affected by loading snow and ice control chemicals and abrasives. Elevated levels of sodium and chlorides are of concern in surface waters used in public water supplies.

Abrasives in streams and rivers can affect water clarity, change the essential character of stream and riverbeds, and have a significant impact on aquatic life by changing bottom and depth characteristics.

Certain vegetation species are sensitive to some de-icing chemicals. If the vegetation resource is considered valuable, protective measures should be taken. Examples of these measures include:

- Changing to non-threatening ice control chemical or abrasives;
- Reducing the chemical application rate;
- Screening or wrapping the vegetation;
- Replacing vegetation with a tolerant species if the chemical cannot be changed.

**11.8. Reports.** The most important document in this process is the work report, or the duty record that is maintained by the individual operators. Route identification and time spent to the nearest 15 minutes should be recorded on the Daily Maintenance Report. The snow and storm records should also be completed.

## **12. REPORTS**

- 12.1. Reporting Requirements.** The reporting requirements reference three memoranda from the Department of the Interior. Those memoranda are included as appendices to this handbook.
- 12.2. Deferred Maintenance Report.** Per the December 16, 2005 directive issued by the Deputy Bureau Director of Field Operations, the two required reports are the Deferred Maintenance Report and the Government Performance Results Act (GPRA) Report. The Deferred Maintenance Report is defined previously in this handbook as the tabulation of costs associated with restoring BIA transportation assets to original condition and expenditures for that purpose. Appendix B, Illustrations 5.
- 12.3. Government Performance Results Act Report (GPRA).** The GPRA Report is defined previously in this handbook as the quarterly report of the Level of Service of existing transportation assets, and is a requirement enacted in 1996 as a means to quantify the results of work performed. The GPRA requires government agencies to submit annual performance plans for Congress along with fiscal year budget requests. A copy of the GPRA Manual, known as the Condition Rating of Service Levels (CRSL) for Roads and Bridges, is included in Appendix D. A sample GPRA report form is included in Appendix B, Illustration 5.
- 12.4. Condition Assessment Report.** In addition, the Condition Assessment Report (see Memorandum dated March 29, 2004, referencing the Policy on Condition Rating of Service Levels (CRSL) for Roads and Bridges) is a necessary tool to standardize the condition rating process for BIA-owned roads and bridges nationwide. This memorandum is included in Appendix B, Illustration 3.
- 12.5. Old Forms.** Certain regions of the BIA continue to use the old Forms 581-585 for the process of data collection and reporting. A summary of these reports and forms is included in Appendix E, Illustrations 9 through 12.
- 12.6. Development of Methods.** Regions have the opportunity to develop their own methods to collect and record the necessary data to prepare the required reports on condition rating and deferred maintenance. Some illustrations and instructions for optional approaches are provided as appendices to this handbook.

### **13. EMERGENCY RELIEF**

- 13.1. High Priority Projects.** The Indian Reservation Roads (IRR) system is eligible for emergency relief through the provisions of 23 CFR Part 668 and 25 CFR Part 170.205(a)(3) IRR High Priority Projects for an emergency/disaster on any IRR transportation facility. Note that this is a reimbursable program, i.e., agency funds should be used for the repairs, with reimbursement provided by FHWA after repairs are completed.
- 13.2. Emergency Relief Funds.** Current legislation in 25 CFR Part 170 defines assistance availability and does not change the provisions of 23 CFR. The Bureau of Indian Affairs and Federal Highway Administration developed very early in the Highway Trust Fund Program a Memorandum of Agreement for interagency procedures on administration of emergency relief funds.
- 13.3. Alternate Funding Sources.** The BIA is not eligible for FEMA, HPP, ER or HUD alternate funding sources but tribes may make application for these funds to support repairs or reconstruction of non-BIA transportation facilities.

This section includes the existing language of the Memorandum of Agreement (MOA) and Subpart B of Part 668 of 23 CFR. Note that titles and terminology may have changed in the years since the issuance of this MOA; all wording is included as originally issued.



## **14. EQUIPMENT MANAGEMENT GUIDELINES.**

### **14.1. General.**

14.1.1. Authority. The Bureau of Indian Affairs (BIA) is authorized to establish and maintain a property management program by the Federal Property and Administration Service Act of 1949 (Pub. L. 81-152). The Road Maintenance Program, Equipment Management Guidelines (EMG) in most part, was derived from 43 IAM (Property Management Regulations).

14.1.2. Purpose. The purpose of the Equipment Management Guidelines, (EMG) is to provide an efficient and effective system for obtaining the maximum safety, availability, and utilization of all government owned equipment (automotive vehicles, construction, maintenance, and support equipment) in the BIA roads programs.

14.1.3. Scope of Program. The Road Maintenance Program, EMG encompasses areas such as organization, staffing, responsibilities, budget planning, equipment inventory, utilization, pool operation, safety, preventive maintenance, major and minor repairs, inspection programs, work request / order system, disposition, and acquisition.

14.1.4. Responsibilities. Responsibilities for administering the EMG are:

14.1.4.1. Establishment of rental rates, rental of equipment, collection of rentals, and keeping records

14.1.4.2. Maintenance, repair, lease, rental, purchase, and disposal of equipment.

14.1.4.3. Evaluation and report on operation performance.

14.1.5. Definitions. As used in this handbook, the following terms should have the meaning as stated:

14.1.5.1. *Annual Physical Inventory.* A physical examination of accountable equipment to verify its existence, condition, and location.

14.1.5.2. *Accountable Materials.* All parts and supplies which are expended to support road equipment.

14.1.5.3. *BIA Transportation Facilities Maintenance Handbook.* This term refers to the Bureau of Indian Affairs, Transportation Facilities Maintenance Handbook, Section 14, Equipment Management.

- 14.1.5.4. *Equipment, Construction and Maintenance.* Machinery used directly in the construction, maintenance, alteration or repair of roads, bridges, airfields, and other similar programs.

Major Equipment. All motor vehicles  $\frac{3}{4}$  ton and larger, heavy construction, maintenance, and weight handling equipment, such as service trucks, dump trucks, scrapers, dozers, loaders, cranes, graders, lowboy trailers and truck / tractors.

Minor Equipment. All motor vehicles  $\frac{1}{2}$  ton and smaller, and support equipment such as pickup trucks, sedans, forklifts, welders, compressors, portable water pumps, power generators, hand held dirt compactors.

Exempt Equipment / Accessories. Special purpose vehicles exempt from utilization standards such as snow removal, fire fighting, crack sealers.

- 14.1.5.5. *Equipment Pool.* This is the pooling of major construction and maintenance equipment under a common organization that directs, controls, and conducts its equipment inspection, maintenance, repair, inventory, replacement and rental programs.
- 14.1.5.6. *Expendable Materials.* Low cost materials that may be used on several units such as gasket materials, welding rods, electrical tapes, wires, nuts and bolts, pipe fittings and materials and supplies that are replaced routinely on equipment.
- 14.1.5.7. *Flat Rate.* The expected time and materials cost to complete a specific repair job on a specific unit is the flat rate. This data is published in commercial flat rate manuals.
- 14.1.5.8. *Holding Office.* BIA Regional Division of Transportation (DOT) office having accountability for government owned major and minor equipment and the Region or Agency DOT Office having accountability for government owned minor equipment.
- 14.1.5.9. *Using Agency.* Bureau or Tribal Program using major or minor equipment for which it does not have accountability. This term applies to programs which rent equipment from the Road Maintenance Equipment Pool.
- 14.1.5.10. *Inspection.* A physical examination of an equipment unit.

- 14.1.5.11. *Maintenance Inspection.* A scheduled physical examination of an equipment unit for deficiencies and the required preventive maintenance services.
- 14.1.5.12. *Maintenance.* The scheduled cleaning, servicing and adjusting necessary to keep a unit in a serviceable, safe and satisfactory operating condition.
- 14.1.5.13. *Man-hours.* The time measured in hours of personal services expended to directly and indirectly maintain, repair, and overhaul equipment.

Indirect Man-Hours. Time expended for overhead such as supervision, office personnel, inspection, training, meetings, leave, shop cleanup, acquiring parts, traveling to and from job sites. This is limited to EMG program personnel only and does not include agency maintenance or force account personnel.

Direct Man-Hours. The productive time expended to actually maintain and repair equipment. The “Flat Rates” time standard to complete a specific job is considered direct man-hours. This is limited to only personnel performing the above.

- 14.1.5.14. *Material Cost Factor.* The average hourly cost for shop parts and supplies expended per man-hour by personnel working directly in maintaining and repairing equipment. This cost factor is obtained by dividing the annual total cost for parts and supplies by the annual total direct man-hours expended during the same period. It does not include parts, supplies, and man-hours expended for major overhauls.
- 14.1.5.15. *Motor Equipment.* Any equipment which is self-propelled including motor vehicles, motorcycles and scooters, construction and maintenance equipment, material handling equipment, aircraft, and vessels. (41 CFR Subpart 114.38.001-50, Definition Terms).
- 14.1.5.16. *Motor Vehicles.* Also known as “automotive vehicle” to include all self propelled vehicles designed for highway operations. Specifically included are sedans, carryalls, flat bed trucks, pickups, tractor trucks, specialized construction rigs mounted on motor vehicles (the transports are to be treated as motor vehicles), and weight handling equipment such as highway mobile truck cranes.
- 14.1.5.17. *Nonexpendable Material.* Property which has continuing use as a self-contained unit, is not consumed in use; does not lose

its identity when put to use; or does not ordinarily become a component of other materials.

- 14.1.5.18. *Preventive Maintenance (PM)*. This is the scheduled inspection and preservation of equipment. Preservation consists of lubricating, servicing, cleaning, adjusting and tightening to keep equipment operable, safe, and reliable.
- 14.1.5.19. *Repairs*. The restoration of equipment to an operable and serviceable condition.

Minor Repairs. Low cost repairs such as replacing broken hoses and fan belts, minor welding, replacing spark plugs that will not extend the life nor increase the value of the machine.

Major Repairs. The rehabilitation, reconditioning, or renovation of a unit or a major system of a unit such as the engine, transmission, track and carrier system to a near new condition that will extend its productive life, thus increasing the current value of the machine.

- 14.1.5.20. *Roads' Equipment*. All equipment assigned to the DOT. This includes all motor equipment considered as major, minor, and support construction and maintenance equipment.
- 14.1.5.21. *Safety Inspection*. The physical examination of equipment for deficiencies that may affect the safe operation as shown on the manufacturer's and operator's daily checklist, as well as any OSHA requirements.
- 14.1.5.22. *Support Equipment*. Roads equipment such as welders, service trucks, steam cleaners and equipment trailers not directly involved in the construction and maintenance of roads, bridges, and other facilities.
- 14.1.5.23. *Tribal Use of Government Equipment*. 25 CFR Subpart "I" provides guidelines for Property Donation Procedures. This subpart includes Government furnished property, Contractor Purchased Property, BIA and Indian Health Service Property, Excess or Surplus Government Property of Other Agencies, and Property Eligible for Replacement Funds.  
  
25 CFR 1000.408 provides guidelines for Supply Sources under the Self Governance Contract.
- 14.1.5.24. *Utilization Standard*. The amount of utilization a piece of equipment is expected to attain annually.

14.1.5.25. *Work Order*. The written document describing and ordering the work to be performed on a piece of equipment. A work order begins as a work request by an operator, inspector, or other personnel. After the written work request is reviewed and authorized, it becomes a work order.

14.1.5.26. *Work Request*. The verbal or written request describing the work to be performed on a piece of equipment. The work request becomes a work order after it is reviewed and authorized.

## **14.2. Inventory.**

14.2.1. General. The Division of Property Management maintains a continuously updated inventory of accountable property. To ensure the accuracy of this inventory, an accountability inspection as prescribed in 14.6.3.1.4 of this handbook will be implemented. Other requirements concerning personal property accountability are set forth in 43 IAM (Property Management Regulations) Subpart 114 H-60.800, Physical Inventories.

### **14.2.2. History and Record File.**

14.2.2.1. *File Maintenance*. A history and record file will be established on each piece of equipment and maintained by the holding office in a complete and up-to-date manner from the time the equipment is acquired to the time it is disposed of or permanently transferred to another program or government agency. Upon completion of this transfer the history and record file will accompany the equipment.

14.2.2.2. *Contents*. The file on each unit of equipment should contain:

- A copy of the equipment acquisition documents (SF-122 Transfer Order of Excess Personal Property, purchase order, contracts, correspondence and other related documents);
- Technical data on identifications which should match the data recorded in the official equipment inventory;
- All work orders;
- Accident reports (FORM DI-134);
- Annual safety inspection reports;
- Completed Operator's Daily Report to be maintained in the file for audit purposes, for a minimum of three years before purging. The forms need not be kept with the history files; however, the physical location should be cross referenced and;

- The technical data on common parts, such as filters, batteries, spark plugs and drive belts for quick reference (optional).

14.2.3. Inventory Updating. Whenever personal property is to be acquired, transferred or disposed of or whenever equipment inventory records should be corrected, the holding office will prepare a memorandum describing the request. The memorandum should be sent to the Area Property Office for review and action. Action as described in 43 IAM Supplement 2 Subpart 114 H-60.7.

### **14.3. Utilization.**

#### 14.3.1. Utilization Policy.

14.3.1.1. Sufficient major and minor equipment should be provided to meet the requirements of the road maintenance programs. Equipment should be utilized to the maximum feasible extent.

14.3.1.2. Equipment in the custody of BIA should be used in the most cost-effective, feasible and efficient manner to meet program needs.

14.3.1.3. The holding office will exercise prudent judgment, when retaining exempt equipment, by considering storage and periodic maintenance cost and the negative effects on the road programs, if any, if this unit was not available on standby. Cost of renting versus owning should also be considered. Consult the Procurement Agent or BIA Procurement Policy Manual for renting/leasing procedures.

14.3.2. Applicability. Applies to motor vehicles and motor equipment in the custody of the Division of Transportation, including government-owned, commercially-leased and rented.

14.3.3. Utilization by Other Programs. The Economy Act, 31 U.S.C., Statute 1535, authorizes the inter- and intra-departmental furnishing of materials or performance of work or services on a reimbursable basis. Reimbursements are set forth and described in 42 IAM Supplement 3 (Financial Management Regulations). To maximize utilization, all motor vehicles and motor equipment, especially those with low recorded utilization, could be made available for rent to eligible programs.

#### 14.3.4. Establishing Utilization Guidelines.

14.3.4.1. Guidelines may be based on the working season for each region and the established annual use of each type of

equipment. The working season for each region should be established based on past records. The annual use of each type of equipment should be compared against other government agencies, commercial reports and current surveys among private equipment contractors throughout the nation. Standards based on these comparisons will be computed by the Division of Transportation.

- 14.3.4.2. The formula to establish the utilization standard for a particular type of equipment will be the annual use of that particular type, make, and model of equipment, minus the equipment service factor; then multiplied by the established factor for the working season of a region.

#### 14.3.5. Retention and Transfer Standards

- 14.3.5.1. For operation above 75% of utilization standards, no justification is required to retain equipment.
- 14.3.5.2. For operation between 50% and 75% of utilization standard, justification signed by the Regional Road Engineer to the Regional Property Officer is required to retain equipment.
- 14.3.5.3. The formula to establish the utilization standard for a particular type of equipment will be the annual use of that particular type, make, and model of equipment, minus the equipment service factor then multiplied by the established factor for the working season of a region.

14.3.6. Utilization Records. Utilization records should be kept in detail and should be accurate and verifiable for the purpose of answering audits, reporting requirements, submitting cost reimbursement for use by eligible programs, and promoting efficiency by controlling standby time and down time for repairs. Reports of utilization in terms of miles or hours of operation should be recorded as follows:

- 14.3.6.1. For BIA motor vehicles such as pickups and dump trucks, utilization should be recorded initially on Form DI-120, Operator's Record. Form DI-120 should be maintained for each BIA motor vehicle to reflect all direct and indirect costs involved in the operation of that vehicle for management purposes and for reporting requirements. Vehicle utilization should also be recorded for reimbursement of use costs from eligible projects.
- 14.3.6.2. For other motor equipment such as graders, dozers and cranes, utilization should be recorded on the Operator's Daily Report,

and summarized monthly. For audit and internal review purposes, the Operator's Daily Report should be retained a minimum of three (3) years and the Monthly Summary Report should be retained a minimum of five (5) years. If equipment use cost is to be requested from eligible programs, the Monthly Summary Report should be one of the source documents to be submitted on a monthly basis for this purpose.

#### 14.3.7. Monitoring Utilization.

14.3.7.1. The equipment pool manager or road maintenance supervisor will be responsible for monitoring utilization. The equipment manager, after consultation with the immediate supervisor, will be responsible for initiating memoranda to the local property officer on equipment available for transfer, and justification to retain equipment that falls between 50% and 75% of utilization standard. All utilization and retention standards will be established and monitored by the Division of Transportation.

14.3.7.2. The best interest of the roads program should be considered in any decision to retain equipment where utilization falls below 50% of the established utilization standard. Should this happen, the equipment manager will initiate a memorandum of justification to the Assistant Secretary from the Regional Director for approval. Copies of these memoranda should be retained in the file to document approval of retention of equipment with low usage rates. Justification should include comparison of the cost of ownership and the cost of rental, the nearest source of other BIA equipment capable of the function, and the availability of contractors.

14.3.8. Establishing Annual Utilization Targets. The annual utilization target of a piece of equipment is the projected hours or miles the equipment is scheduled to be operated. This will be based on the road construction control schedules for construction equipment and past records as well as future scheduled projects for maintenance equipment.

### **14.4. Road Equipment Pool Operation.**

14.4.1. Authority. The Economic Act, 31 U.S.C., Statue 1535, authorizes the inter- and intra-departmental furnishing of materials or performance of work or services on a reimbursable basis. Other authorities which provide for the recovery of allowable costs and associated overhead costs, and the distribution of charges to the benefiting projects on which the equipment is used, are found under Statutes 23 U.S.C 120 and 121; 31 U.S.C. 686; and under regulation 23 CFR Part 140, Subpart G; and 48 CFR Part 31.6. Equipment Pools are established to efficiently utilize major and minor



equipment and charge rent for pool equipment used for road construction and maintenance programs and other eligible programs for the purpose of recovering costs to maintain and replace equipment.

14.4.2. Purpose. Equipment Pools are established at the Regional levels as the mechanism to provide major and minor equipment to the road maintenance and construction programs and other eligible programs on a cost reimbursable basis separate from other roads activities. Funds generated from equipment rental, which are the sole source of income for the equipment pools, are recorded in the Roads Equipment Pool Account. Funds may accumulate from year to year and be used when required, but are restricted to equipment replacement, operation, maintenance, and support functions. The rental rates should be adjusted periodically.

14.4.3. Eligible Programs. The Road Maintenance Program – Equipment Pool Operations, primary function is to provide major equipment to the Bureau's Road Maintenance programs, and the Bureau's Highway Trust Fund Road Construction. However, if it is in the interest of the Bureau, i.e., to maximize utilization, equipment may be rented to the following eligible programs:

14.4.3.1. All other BIA branches such as Forestry and land Operations by legal memorandum of understanding.

14.4.3.2. All other Federal agencies by legal memorandum of agreement;

14.4.3.3. Other projects by legally sufficient agreements with BIA contractors, or state or local governments.

14.4.4. Reimbursement and Direct Charges. Equipment pools should request reimbursement authority from the Division of Program Development and Implementation. Reimbursement should be based on projected income from program equipment rentals to other programs. Direct charge procedures should replace reimbursements when involving the same appropriation.

14.4.5. Reimbursement Policy. Reimbursement authority in the Road Maintenance Program – Equipment Pool Operation, should be requested on a FY basis. Approval should be received before the equipment pool is authorized to collect rent as reimbursement for equipment use. The reimbursement authority amount should be the estimated projected equipment use cost (to include depreciation of actual acquisition cost and other allowable equipment pool operation costs) based on control schedules and other plans. Rental rate for all motor vehicles and support equipment should be calculated for use. This will be reported on Form BIA-5723, Equipment Utilization and Assignment Rental Charges

Monthly Report. Procedures for requesting and processing reimbursements should be in accordance with 42 IAM Supplement 3, Section 21.

14.4.6. Direct Charge Policy. The Road Maintenance Program – Equipment Pool Operation should use Intra-Bureau Cash Transaction Authority when recovering costs associated with equipment rental within the same appropriation. Reimbursements are not appropriate within the same appropriation, therefore intra-Bureau transaction procedures as described in 42 IAM Supplement 3, Section 3.5 will be followed for all direct charges.

14.4.7. Cost Allocation Plan. The equipment pool should have a cost allocation plan. This plan provides for the documentation, identification, and accumulation of all allowable costs that will support the eventual distribution of these costs to all users. The plan should be formal and based on current federal cost principles outlined in the Office of Management and Budget (OMB) A-87; General Accounting Office (GAO) Title 2 – Accounting, Appendix I “Accounting Principles and Standards” and other applicable regulations, instructions, and policies. An adequate method to segregate costs and separate the distribution of these costs should be adopted. The items of cost should be directly attributed to and properly and equitably allocated to all user programs.

14.4.8. Actual Cost Allocation. Actual costs and liabilities should be fully accounted for, controlled and reviewed periodically. Forms should be used to document equipment maintenance, repair, and utilization, and should be accurate and verifiable.

14.4.9. Equipment Rental System.

14.4.9.1. A rational and uniform method of calculating and assessing rental rates that identify the different costs for allocation and recovery should be established. To comply with current federal cost principles, equipment rental rates for each unit should be established by the hour, day (shift), week, or month. Equipment that operates continuously may be rented by the hour. Equipment that operates in conjunction with other equipment or other operation may be rented by the day or shift. Such equipment often operates at idle speed, and the odometer or hour meter usually does not accumulate actual hours of operation. Equipment that may not operate as often but is required by the user to be on the project may be rented by the week or month.

14.4.9.2. When a project requests a standby unit, the rental rate for standby time (the time period when equipment is available,

ready for work, but is not put into operation until needed) will be negotiated with the user. The established rental rate should be equal to the ownership costs that continue even if the unit is not operating. It is essential that a rental system and rental rates are developed to recover all allowable costs.

14.4.10. Establishing Rental Rates. The rates should be such that all allowable costs are recovered to repair, maintain, and replace equipment. Costs such as profit, contingencies, and inflation escalation are not allowed.

**14.5. Safety.** Safety requirements are identified in 25 IAM and Safety and Health for Field Operations; BIA Safety and Health Handbook, US Dept of the Interior, Bureau of Indian Affairs. The BIA Safety and Health Handbook *...was developed to complement 25 IAM and lays the groundwork for incorporating occupational safety and health into the planning of all bureau work projects and tasks. The handbook will assist supervisors in providing a safe and healthful workplace for bureau employees. It will provide employees with information on safe work practices, identification of hazards, and reporting of unsafe working conditions. All employees are responsible for familiarizing themselves with [the BIA Safety and Health Handbook] and for utilizing safe work practices and procedures during performance of duties. For purposes of the [BIA Safety and Health Handbook], bureau volunteers are considered to be employees.*

14.5.1. Operating Qualifications. All BIA and contractor personnel operating U.S. Government vehicles and equipment should be qualified and hold a U.S. Government Motor Vehicle Operators Identification Card, Optional Form 346. Operating requirements are set forth in:

14.5.1.1. Safety and Health for Field Operations; BIA Safety and Health Handbook, US Dept of the Interior, Bureau of Indian Affairs.

14.5.1.2. Part 488 of the Department Manual.

14.5.1.3. Title 5, Part 930, Subpart A of the Code of Federal Regulations.

14.5.1.4. Occupational Safety and Health Administration (OSHA) 29 CFR 1926.

14.5.1.5. The Federal Motor Carrier Safety Regulations of the U.S. Department of Transportation.

14.5.1.6. State motor vehicle laws.

14.5.1.7. Policy Statement on Motor Vehicle Operations Policy - May 3, 2006

14.5.2. Safety Practices. The operation and maintenance of equipment and the repair shop will be in accordance with safety principles. Those working with or on equipment or in the maintenance shop will comply with the requirements and standards of the following references and manuals:

14.5.2.1. Occupational Safety and Health Administration (OSHA), 29 CFR 1910 through 1960.

14.5.2.2. Equipment Maintenance and Shop Safety, 25 IAM and Safety and Health for Field Operations; BIA Safety and Health Handbook, US Dept of the Interior, Bureau of Indian Affairs.

14.5.2.3. Accident Prevention Activities, 25 IAM and Safety and Health for Field Operations; BIA Safety and Health Handbook, US Dept of the Interior, Bureau of Indian Affairs. Copies can be obtained by contacting Bureau of Indian Affairs, Division of Safety & Risk Management, Room No. 331, 1011 Indian School Road, N.W., Albuquerque, NM 87104

14.5.3. Safety Inspection of Equipment.

14.5.3.1. *Daily Safety Inspection.* Each equipment unit in active use should be inspected for safe operation as a part of the daily inspection. Equipment pool personnel should report any condition believed to be unsafe. The equipment pool manager should respond to all reports and take appropriate action. This daily inspection should be recorded and filed.

14.5.3.2. *Annual Safety Inspection.* The inspection can be scheduled along with the required preventive maintenance inspection. The discrepancies should be documented. A safety check list should be developed and used to make a systematic inspection for unsafe conditions. All discrepancies and the actions taken should be recorded and filed in the unit's permanent history record.

14.5.4. Equipment to be Inspected.

14.5.4.1. Motor vehicles.

14.5.4.2. Other motor equipment (major construction, maintenance, and support).

14.5.4.3. Lifting cranes.

14.5.5. Safety Meetings. The equipment pool manager should conduct safety meetings periodically, as authorized in 25 IAM and Safety and Health for

Field Operations; BIA Safety and Health Handbook, US Dept of the Interior, Bureau of Indian Affairs.. A shop safety meeting should be conducted after each accident to discuss the ways such accidents may be prevented. These meeting notes should be recorded and kept on file for a determinate period.

- 14.5.6. Safety Equipment. Shop personnel and operators should be provided appropriate personal protective clothing and equipment, as dictated by job requirements, to meet the standards of 25 IAM and Safety and Health for Field Operations; BIA Safety and Health Handbook, US Dept of the Interior, Bureau of Indian Affairs.

#### **14.6. Equipment Maintenance and Repair.**

- 14.6.1. Policy. The BIA is to provide operable, safe and reliable equipment in a timely manner to support the road construction and road maintenance programs. Therefore, efficient and effective equipment inspection, preventive maintenance, and repair programs should be implemented in compliance with 82 IAM.

- 14.6.2. Repair Facilities. The holding office should provide adequate facilities and resources to carry out the equipment inspection, maintenance and repair programs required by 41 CFR 114.42.2, Property Rehabilitation Services Performed by Federal Facilities. When the equipment inventory is too small to justify continuance or establishment of equipment repair facilities, other repair arrangements should be accomplished.

- 14.6.3. Elements of an Equipment Maintenance and Repair System.

- 14.6.3.1. *Inspections.* The holding office personnel should physically inspect all equipment in use and in storage to assure it is properly maintained and accountable. The following are the different inspections:

- 14.6.3.1.1. Daily Inspection. Operators are responsible for inspecting the equipment they operate. Deficiencies noted before, during, or after operation should be reported on the Operator's Daily Report Form for appropriate action, (29 CFR 1926.601, OSHA Motor Vehicles). If able, the operator may repair the defects; otherwise, the operator should make a verbal and written report using the Operator's Daily Report Form requesting work to be performed.

- 14.6.3.1.2. Preventive Maintenance (PM) Inspection. Each active unit of equipment should be inspected in accordance with the manufacturer's prescribed

intervals for required servicing of equipment, (41 CFR 101.38.10, Preventive Maintenance (PM) of Motor Vehicles). The required PM should be requested and recorded on the Work Request / Order Form.

14.6.3.1.3. Safety Inspection. As required in Section 14.5.3 of this handbook.

14.6.3.1.4. Accountability Inspection. Each unit of equipment that has no record of activities; utilization reports, PM, repair work orders, or fuel records, should be physically inspected at least annually, but may be inspected at more frequent intervals at the discretion of the head of each responsible office. The ID tag, serial, model number, and make of the equipment should be identical with the recorded data on the official Division of Property Management, personal property inventory list. If there is evidence of discrepancies, further examination should be conducted to determine the proper identification. The completed form will be part of the unit's permanent record.

14.6.3.2. *Type of Maintenance and Repairs.* Maintenance and repairs carried out by the equipment shop usually fall under one of the following categories:

14.6.3.2.1. Corrections Requested in Operators Inspections.

The Operators are the first line of defense in keeping equipment operable, safe, and reliable. Therefore, the implementation of the daily equipment inspection by the operators will be considered when evaluating their work performance.

14.6.3.2.2. Unscheduled Maintenance and Repairs. This work will generally be limited to correcting those items reported as being deficient by field personnel and confirmed as being deficient by the shop supervisor. If the mechanics observe other minor deficiencies, these should be corrected without prior approval and recorded to account for the time and material expended. However, if the repair appears to be major, the shop supervisor will be consulted for a determination.

14.6.3.2.3. Scheduled Major Repairs and Overhauls. This work should be scheduled and timed with the shop workload and with the overall road construction and maintenance operations to reduce equipment down time and to provide the necessary equipment during the peak work period. Major repairs performed in-house should be justified from an economical and warranty standpoint before being scheduled.

## **14.7. Equipment Disposal.**

14.7.1. Removal of Equipment From Inventory. The BIA strives to refrain from retaining equipment longer than necessary because this adds unnecessary equipment maintenance and repair costs and delays the acquisition of newer equipment. When appropriate, the Holding Office should remove equipment from its inventory by declaring it either:

- 14.7.1.1. Obsolete;
- 14.7.1.2. No longer economical to repair;
- 14.7.1.3. Excess to its needs.

### **14.7.2. Methods of Disposal.**

- 14.7.2.1. Transfer to BIA Branch which has use for equipment.
- 14.7.2.2. Use as trade-in for savings to the Government on new and replacement equipment.
- 14.7.2.3. Transfer to Indian Tribes and Tribal Organizations. The Division of Transportation procedures for such transfers are found in the BIA Procurement Policies and are in compliance with P.L. 93-638, Indian Self-Determination and Education Assistance Act as described in P.L. 100-472, which provides statutory authority. For procedural guidelines, maintenance personnel should consult the regional Procurement Agent or the Awarding Official.
- 14.7.2.4. Make available to other Government agencies through General Services Administration (GSA).
- 14.7.2.5. GSA or local agency auction.

## **14.8. Equipment Acquisition.**

14.8.1. Policy. All equipment acquisition regardless of source should be in accordance with BIA regulations and policies, the Federal Acquisition Regulations (FAR), and other applicable Federal Regulations.

14.8.1.1. Road equipment should be selected and acquired with regard to:

14.8.1.1.1. Overall utilization;

14.8.1.1.2. Flexibility (overall purpose or use design);

14.8.1.1.3. Cost (initial and projected lifetime maintenance);

14.8.1.1.4. Purchase-versus-lease - Instruction and policies cited in 41 CFR 101-25.5 and 48 CFR 7.4 (FAR);

14.8.1.1.5. Existing federal equipment contracts available for use by the BIA;

14.8.1.1.6. The ability of the holding office to repair and maintain the unit.

14.8.1.2. The holding office, through continuing efforts, will evaluate equipment needs to accomplish the Bureau's program goals. These needs may be for replacement, new acquisition, or upgrade of equipment. The Division of Transportation will have the approving authority on all requests. No major road construction or maintenance equipment can be acquired without approval from the Division of Transportation. The Division of Transportation may establish equipment acquisition contracts with equipment vendors nationally with various options for the area's needs.

Replacement of equipment will be accomplished using accumulated depreciation funds and residual funds (trade-in value). When program funds are not available, the Regional Road Engineer with justification may apply for funds using BIA Form 584, Equipment Needs Report.

New acquisitions or upgrade of equipment will be accomplished with program funds and / or applying for funding using BIA Form 584, Equipment Needs Report. Program funds are not required but may replace Division of Transportation's limited funds.



# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDICES**

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX A POLICY STATEMENT**

Illustration 1: Motor Vehicle Operations Policy - May 3, 2006



THE ASSOCIATE DEPUTY SECRETARY OF THE INTERIOR  
WASHINGTON, DC 20240

MAY - 3 2006

Memorandum

To: Deputy Assistant Secretaries  
Director, Bureau of Indian Affairs  
Director, Office of Indian Education Programs  
All Central Office Directors  
All Regional Directors  
All Education Line Officers

From: Associate Deputy Secretary

Subject: Motor Vehicle Operation Policy

*James E. Cason*

In compliance with the requirements of 5 CFR 930 and the Department's Motor Vehicle Safety Policy, 485 DM 16, this Motor Vehicle Operation Policy (Policy) is to establish clear responsibilities for employees, supervisors, and managers, and to promote the safe and prudent operations of motor vehicles while performing assigned duties in support of Indian Affairs (IA). This Policy supersedes the New Motor Vehicle Operation Policy for the Bureau of Indian Affairs (BIA) signed by the Assistant Secretary - Indian Affairs on March 19, 2004.

I. Definitions

- A. Employee. All permanent, temporary, intermittent, and contract employees; interns; student teachers; and administratively determined (AD) emergency workers as defined in 5 U.S.C. 2105.
- B. Motor Vehicle. A Government owned, rented or leased motor vehicle and/or privately owned, rented or leased motor vehicle, with a gross vehicle weight (GVW) of less than 26,000 pounds, designed to transport less than 15 people, and which does not haul hazardous materials or tow vehicles with a GVW of 10,000 pounds or more (e.g. sedans, light trucks, sports utility vehicles (SUVs) and all terrain vehicles (ATVs).
- C. Motor Vehicle Operator. An employee who drives a motor vehicle, including commercial motor vehicles, in the performance of their duties and responsibilities.
- D. Commercial Operator. An employee who operates a commercial vehicle and is required to possess a Commercial Driver's License (CDL).
- E. Commercial Motor Vehicle. A vehicle having a GVW rating of more than 26,000 pounds, a vehicle towing a trailer weighing 10,000 pounds or more, a vehicle hauling hazardous material which requires display signs noting the hazardous material content

of the vehicle, a vehicle designed to transport 15 or more people including the driver, or a school bus. Operators of these vehicles must have a valid CDL.

## II. Driver Qualifications

An employee may be authorized to drive on Indian Affairs business if he or she satisfies the following requirements:

- A. Be 18 years of age or older;
- B. Has a valid State driver's license;
- C. Has the requisite experience needed to drive the type of vehicle being assigned or used;
- D. Has no convictions or uncontested citations within the three-year period immediately preceding their submittal of GSA Form 3607, Motor Vehicle Operator's License and Driving Record, for Reckless Driving, Driving While Intoxicated (DWI), Driving Under the Influence (DUI) or Leaving the Scene of an Accident;
- E. Has not demonstrated a pattern of unsafe driving or behaviors (e.g. drug or alcohol abuse, unusual aggression, etc.) that would cause a supervisor to question the likelihood that the individual will drive safely and prudently while on Indian Affairs business; and
- F. Possesses current Motor Vehicle Operators Authorization from his/her supervisor.

## III. Roles and Responsibilities

- A. Deputy Assistant Secretaries, BIA Director, Deputy Directors and Regional Directors, and Director, Office of Indian Education Programs (OIEP) are responsible for carrying out the requirements of this policy within their areas of responsibility.
- B. Managers, supervisors, contracting officers and awarding officials must:
  - 1. Carefully consider whether duties and responsibilities assigned to an employee require the operation of a government-owned or government-leased motor vehicle, commercial motor vehicle, rental motor vehicle, or privately-owned or privately-leased motor vehicle in the performance of official or contractual duties, responsibilities or activities, including duties of record and other duties assigned or historically assigned to such positions or activities;
  - 2. Ensure that each IA Motor Vehicle Operator under their supervision possesses a valid driver's license that indicates State authorization to operate the class of vehicle required in the performance of duties. This responsibility is met by ensuring each employee completes the annual Authorization Process

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX B    MEMORANDA AND EXAMPLE**

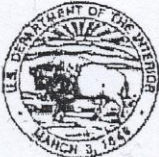
- Illustration 2:    *Reporting of Deferred Maintenance Assessment for Road Maintenance Program, December 16, 2005*
- Illustration 3:    *Policy on Condition Rating of Service Levels for Roads and Bridges, March 29, 2004*
- Illustration 4:    *GPRA Quarterly Reporting Requirements, June 28, 2005*
- Illustration 5:    Example Performance Report

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX B    MEMORANDA AND EXAMPLE**

Illustration 2:    *Reporting of Deferred Maintenance Assessment for  
Road Maintenance Program, December 16, 2005*





IN REPLY REFER TO  
Transportation  
MS-320-SIB

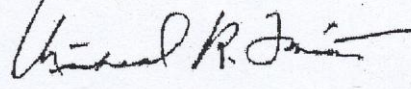
## United States Department of the Interior

BUREAU OF INDIAN AFFAIRS  
Washington, D. C. 20240

DEC 16 2005

### Memorandum

To: All Regional Directors

From: Deputy Bureau Director, Field Operations 

Subject: Reporting of Deferred Maintenance Assessment for Road Maintenance Program

The Bureau of Indian Affairs (BIA) has been compiling and submitting Deferred Maintenance Assessment reports to the Department of the Interior (DOI) starting fiscal year (FY) 2000. Since then, the policies and procedures have been sent out to all regions at various times. Attached is a copy of a policy memorandum dated March 29, 2004, signed by the Acting Director, BIA requesting all regions to perform the Condition Assessment for roads and bridges. The memo asked regions to complete the condition assessment by September 30, 2004. This data is an essential basis for the Deferred Maintenance Assessment and the Government Performance Results Act (GPRA) reports.

Recently, KPMG who is a contract auditor for the DOI has provided us with a Notice of Finding and Recommendation (NFR) which required a corrective action plan (CAP) by the BIA's Division of Transportation (BIADOT). One of the required corrective actions is to coordinate with the Deputy Regional Director - Indian Services (DRD-IS) for each region on the timeliness for deferred maintenance estimates to assure timely reporting with complete and accurate data. In order to achieve this action item, we need your cooperation to complete the Condition Assessment on all roads and bridges as described in the aforementioned attached memo. The complete and accurate condition assessment is essential to the successful reporting needs of the deferred maintenance assessment on roads, bridges and equipment. We ask your office to certify the reports for their completeness and accuracy before submitting them to the Central Office.

Mr. Paul Sunwoo, Deputy Chief, BIADOT, Central Office is responsible for complying with all CAP items for the BIA Road Maintenance Program. He will contact DRD-IS Office upon receipt of report due dates from the DOI. Please give him your support and cooperation to make this effort a success. For any questions regarding the deferred maintenance assessment, he can be reached by phone at (202) 513-7712.

Attachment

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX B    MEMORANDA AND EXAMPLE**

Illustration 3:    *Policy on Condition Rating of Service Levels for  
Roads and Bridges, March 29, 2004*





United States Department of the Interior

BUREAU OF INDIAN AFFAIRS  
Washington, D.C. 20240

MAR 29 2004

IN REPLY REFER TO:  
Division of Transportation  
MS-4058-MTB

Memorandum

To: All Regional Directors  
Attention: Regional Road Engineer  
ISI Brian J. Pogue

From: Acting Director, Bureau of Indian Affairs

Subject: Policy on Condition Rating of Service Levels for Roads and Bridges

The purpose of this memorandum is to establish a Bureau policy on determining the condition rating of roads and bridges. The Bureau of Indian Affairs (BIA) National Road Maintenance Management Seminar was held at Portland, Oregon on March 2 - 4, 2004. One of the topics discussed at the meeting, was the importance of meeting the initial Government Performance Results Act reporting due date of April 15, 2004, for the first two quarters and to complete the condition assessment of all BIA- owned roads and bridges by September 30, 2004, for FY 2004.

To comply with the Department of the Interior Strategic Plan and its due dates, it has become necessary to standardize the condition rating process for BIA-owned roads and bridges nationwide. It is the Bureau policy, effective immediately, to use a manual on the "Condition Rating of Service Levels for Roads and Bridges", that was handed out to all regional representatives at the meeting. As the rating process continues, the manual may be revised and updated to reflect more accurate methods as they are identified by a work group representing the program management that will be formed in the near future.

If you have any questions regarding this policy, you may call the Division of Transportation at (202) 219-0082.

bcc: 2608urname/400Chron/200RF  
PSUNWOO:kb:03/10/04:219-0082  
Corr:LGISHL:img:3/16/04:208-6002

## **APPENDIX B    MEMORANDA AND EXAMPLE**

Illustration 4:    *GPRA Quarterly Reporting Requirements, June 28, 2005*



## United States Department of the Interior

OFFICE OF THE SECRETARY  
Washington, D.C. 20240

JUN 28 2005

### Memorandum

To: Deputy Director – Field Operations  
Deputy Director – Trust Services  
Deputy Director – Tribal Services  
Deputy Director – Law Enforcement Services  
Regional Directors

Through: Director, Bureau of Indian Affairs *[Signature]*

From: Deputy Assistant Secretary – Indian Affairs (Management) *[Signature]*

Subject: GPRA Quarterly Reporting Requirements

Quarterly reporting is a critical requirement under the Government Performance and Results Act (GPRA) and is an important component of performance management and budget justification. As you are aware, in fulfilling the reporting requirement, the Indian Affairs (IA) compiles detailed quarterly performance reports for review by IA management and for submission to the Department to profile our efforts toward goal attainment for the year.

A sample of the new reporting form for submission of the quarterly data is attached. Please note the new item requested at the end of the report on how many tribes were contacted for information and how many actually provided information, so we can determine the accuracy of our reporting. Other than this item, you only need to provide report data for the individual data elements in column 3 and/or the explanation in the final column titled narrative. The other columns list the goals or have formulas that will automatically calculate the goal percentage for you based on the individual numbers you provide in column 3. A copy of this form in Excel format has been provided via e-mail to each regional and central office GPRA coordinator. In turn, the coordinators should provide an electronic version of this form to all program offices for use in collecting and/or consolidating their individual program data.

All reporting data from regional locations is to be consolidated by the individual programs at the region and should include data gathered from tribes and agencies. It is the responsibility of the individual programs to ensure that they are contacting the tribes and providing them with the necessary data elements to track for reporting purposes. The program should maintain a GPRA file that verifies all numbers reported as this information does get audited each year. The programs should then provide their consolidated data to the designated GPRA coordinator for the consolidation of the overall Regional report. A list of Regional GPRA coordinators is attached. The

Regional report must then be reviewed and concurred by each Regional Director and forwarded to the designated Central Office GPRA coordinators with a cc to Susan Stewart-Flannagan in the Office of Planning and Policy Analysis. Quarterly reports are due from the Regional Offices on the following dates:

First Quarter - January 15  
Second Quarter - April 15  
Third Quarter - July 15  
Fourth Quarter - September 9

(If these dates fall on a weekend the following Monday will become the due date)

Central Office GPRA coordinators will forward the regional reports to their appropriate Central Office program staff, whose responsibility it is to ensure that the information in the reports is correct and complete. If there are any issues or errors within the regional submissions, the Central Office programs should contact their regional counterparts themselves to resolve or correct them. The Central Office programs should then provide their consolidated data back to their designated GPRA coordinator for the consolidation of the overall report for their individual directorate. The overall report must then be reviewed and concurred by each Deputy Director. Quarterly reports are due from the individual Directorates on the following dates:

First Quarter - January 22  
Second Quarter - April 22  
Third Quarter - July 22  
Fourth Quarter - September 16

(If these dates fall on a weekend the following Monday will become the due date)

The completed report from all Central Office directorates should be submitted by the designated due date via e-mail to Susan Stewart-Flannagan with a cc to Jeannine Brooks in the Office of Planning and Policy Analysis. No reports will be accepted without the appropriate Deputy Director's concurrence.

In instances where actual figures are not available for quarterly reporting, both regional and central office reports are required to provide a narrative status of the program's efforts towards goal attainment. Your final fourth quarter report must include actual data or estimates of final performance based on strong statistical information. Do not guess at your estimates, the auditors will ask you to produce evidence of where your estimate came from.

If you have any questions concerning the reporting requirements, please contact Jeannine Brooks, Strategic Planning Officer, at (202) 219-1650.

Attachments

cc: Central Office GPRA Coordinators  
Regional GPRA Coordinators

## **APPENDIX B    MEMORANDA AND EXAMPLE**

Illustration 5:    Example GPRA Performance Report

Program Office	Measure Reference Number, Numerator, Denominator	1st Qtr Data	2nd Qtr Data	3rd Qtr Data	4th Qtr Data	Target	YTD Status	Narrative	638 Contracts	Compacts
INDIAN SERVICES	Roads									
	Percent of bridges in acceptable condition based on the Service Level Index. <b>SP and PART</b>		63%					Narrative: The bridges reported by the Regions are consistent with the Bridge Management System (BMS) used in FY 2007. The BMS is currently being updated and will be reflected in the second quarter GPRA Report.		
	<u>Numerator:</u> Number of bridges in the BIA Inventory in acceptable condition based on the Service Level Index in the reporting year		114							
	<u>Denominator:</u> Number of bridges in the BIA Inventory in the reporting year		180							
	Percent of miles of road in acceptable condition based on the Service Level Index. <b>SP and PART</b>		10%					Narrative: The miles of roads reported by the Regions are consistent with the Road Inventory Field Data System (RIFDS) used in FY 2007. The RIFDS is currently being updated and will be reflected in the second quarter GPRA Report.		
	<u>Numerator:</u> Number of miles of road in the BIA Inventory in acceptable condition based on the Service Level Index in the reporting year		647							
	<u>Denominator:</u> Number of miles of road in the BIA Inventory in the reporting year		6,177							
	Cost per mile of roads maintained in acceptable condition [index weighted by # of roads maintained in acceptable condition]. <b>PART (EFF)</b>		\$ 9,140					Narrative: It reflects only road maintenance funds which are appropriated to the BIA.		
	<u>Numerator:</u> Total dollar amount received for maintenance		\$ 5,913,461							
	<u>Denominator:</u> Total miles of road maintained in acceptable condition		647							
							Certified by: Date:			

## **BIA Handbook for Transportation Facilities Maintenance**

### **APPENDIX C   WORKSHEETS**

Illustration 6:    Deferred Maintenance Assessment Worksheet

## Illustration 7: Example Deferred Maintenance Worksheets for Bridges, Roads & Equipment



# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX C   WORKSHEETS**

Illustration 6:    Deferred Maintenance Assessment Worksheet  
(For sample purpose, only)

**Illustration 4: Deferred Maintenance Assessment Worksheet**

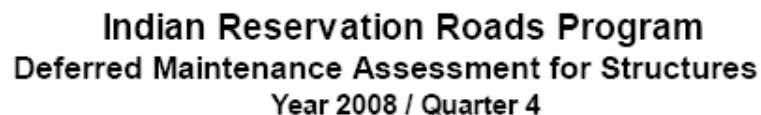
Reservation: N00780 - Navajo Region Hdqtrs

Route Number	Surface Type Code	Length (mi)	Level Of Service Code	Total Maintenance Need (\$)	Roadside Maint. Performed (\$)	Surface Maint. Performed (\$)	Total Maint. Deferred (\$)
2002	4 - Bitumenous < 2"	2.6	2-Good	11,180	128	342	10,710
2003	4 - Bitumenous < 2"	4.0	2-Good	17,200	198	525	16,477
2004	4 - Bitumenous < 2"	1.9	2-Good	8,170	94	250	7,826
2005	4 - Bitumenous < 2"	3.0	2-Good	12,900	148	755	11,997
2006	4 - Bitumenous < 2"	1.4	3-Fair	11,480	69	184	11,227
2007	4 - Bitumenous < 2"	7.2	2-Good	30,960	4,011	3,095	23,854
2009	4 - Bitumenous < 2"	7.9	2-Good	33,970	390	1,037	32,543
2011	1 - Earth Road	0.7	2-Good	2,030	475	92	1,463
2011	4 - Bitumenous < 2"	8.5	2-Good	36,550	5,974	1,116	29,560
2012	4 - Bitumenous < 2"	0.4	2-Good	1,720	20	74	1,626
2015	4 - Bitumenous < 2"	3.2	2-Good	13,760	3,397	2,105	8,258
2016	4 - Bitumenous < 2"	1.0	2-Good	4,300	382	296	3,622
2017	4 - Bitumenous < 2"	2.3	2-Good	9,890	696	395	8,799
2018	4 - Bitumenous < 2"	1.4	3-Fair	11,480	69	184	11,227
2020	4 - Bitumenous < 2"	0.3	1-Excellent	630	15	65	550
2021	4 - Bitumenous < 2"	0.2	2-Good	860	10	55	795
2025	4 - Bitumenous < 2"	5.2	1-Excellent	10,920	963	683	9,274
2030	4 - Bitumenous < 2"	12.0	2-Good	51,600	4,929	1,575	45,096
2302	4 - Bitumenous < 2"	1.0	2-Good	4,300	0	0	4,300
2303	4 - Bitumenous < 2"	0.9	2-Good	3,870	0	0	3,870
2304	4 - Bitumenous < 2"	0.9	2-Good	3,440	0	0	3,440
2305	4 - Bitumenous < 2"	0.5	3-Fair	4,100	0	0	4,100

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX C   WORKSHEETS**

Illustration 7:    Example Deferred Maintenance Worksheets for  
Bridges, Roads & Equipment



Filter		
Region	Agency	Reservation
N	**	***



N32780 - Navajo (Shiprock)

Length (m)	Str Nbr	Insp Date	Name	LOS	Suff Rate	Func. Cat.	State	Route	Urgent (\$)			Non-Urgent (\$)			Total (\$)		
									Need	Per.	Deferred	Need	Per.	Deferred	Need	Per.	Deferred
18.2	N201	12/10/2007	CHACO WASH BRIDGE	2-Good	81.0	0-ND	NM	N3	0	0	0	29,400	0	29,400	0	0	0
	N203	12/11/2007	RED ROCK WASH BRIDGE	2-Good	80.1	0-ND	AZ	N13	3,800	0	3,800	7,700	0	7,700	11,500	0	11,500
	N208	11/03/2004	IRRIGATION CANAL BRIDGE	5-Failing	45.6	1-SD	NM	N562	12,600	0	12,600	8,000	0	8,000	20,600	0	20,600
	N213	12/07/2007	CLAH WASH BRIDGE	4-Poor	74.2	2-FO	NM	N5001	450	0	450	0	0	0	450	0	450
	N214	02/27/2001	CAPTAIN TOM WASH	5-Failing	16.6	1-SD	-		0	0	0	0	0	0	0	0	0
	N225	12/06/2007	IMMANUEL MISSION BRIDG	4-Poor	54.9	2-FO	AZ	N5037	200	0	200	200	0	200	400	0	400
	N226	12/06/2007	IRRIGATION CANAL BRIDGE	5-Failing	9.3	1-SD	NM	N5031	3,000	0	3,000	300	0	300	3,300	0	3,300
	N228	12/06/2007	TOH-CHIN-LIN WASH BRIDG	5-Failing	3.0	1-SD	AZ	N5037	1,700	0	1,700	300	0	300	2,000	0	2,000
	N229	12/11/2007	RED ROCK WASH BRIDGE	1-Excellent	97.0	0-ND	AZ	N63	2,200	0	2,200	19,300	31	19,269	21,500	31	21,469
	N230	12/06/2007	KIT SILI WASH BRIDGE	5-Failing	45.5	1-SD	AZ	N5045	1,200	0	1,200	1,800	0	1,800	3,000	0	3,000
	N231	12/05/2007	MONTEZUMA CREEK BRIDG	4-Poor	66.6	1-SD	UT	N5099	1,000	0	1,000	1,500	0	1,500	2,500	0	2,500
	N232	12/11/2007	STA: 551-00-N13	1-Excellent	93.4	0-ND	NM	N13	0	0	0	1,700	17	1,683	0	17	0
19.3	N233	12/11/2007	STA: 554-00-N13	1-Excellent	93.4	0-ND	NM	N13	900	0	900	3,000	17	2,983	3,900	17	3,883
	N234	12/11/2007	STA: 557-00-N13	1-Excellent	93.4	0-ND	NM	N13	700	0	700	5,000	17	4,983	5,700	17	5,683
	N235	12/11/2007	GARFIELD LOOP BRIDGE	5-Failing	35.7	1-SD	NM	N132	3,500	0	3,500	500	0	500	4,000	0	4,000
	N236	12/11/2007	LITTLE SHIPROCK WASH BRI	1-Excellent	93.4	0-ND	NM	N13	0	0	0	8,600	17	8,583	0	17	0
	N239	12/12/2007	STA: 1136+18,N36	2-Good	84.4	0-ND	NM	N36	0	0	0	7,500	135	7,365	0	135	0
	N240	12/11/2007	HORSE MESA WASH BRIDGE	1-Excellent	90.9	0-ND	AZ	N63	300	0	300	7,800	31	7,769	8,100	31	8,069
	N241	12/07/2007	TOADLENA NORTH BRIDGE	5-Failing	6.4	1-SD	NM	N5001	4,600	0	4,600	200	560	-360	4,800	560	4,240
	N243	12/11/2007	STA:291+78	1-Excellent	95.5	0-ND	AZ	N63	20,000	0	20,000	6,500	31	6,469	26,500	31	26,469
	N244	12/11/2007	STA:312+75	2-Good	84.3	0-ND	AZ	N63	20,000	0	20,000	7,300	1,191	6,109	27,300	1,191	26,109
	N245	12/12/2007	CHACO RIVER BRIDGE	1-Excellent	90.3	0-ND	NM	N36	0	0	0	21,400	0	21,400	0	0	0
	N246	12/10/2007	TOCITO WASH BRIDGE	2-Good	88.8	0-ND	NM	N5003	3,900	0	3,900	1,900	909	991	5,800	909	4,891

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Back Forward Stop Home Search Favorites Reload Print Mail New Window Open Recent

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Save a Copy Print Mail New Window Open Recent Search Select 91% Sign

## Indian Reservation Roads Program

### Deferred Maintenance Assessment for Equipment

Year 2008 / Quarter 4

Filter		
Region	Agency	Reservation
N	**	***

**N - Navajo**  
**N00 - Navajo Region Off**  
**N00374 -**

Equipment Make & Model	Equipment Number	Minor Repair (\$)			Major Repair (\$)			Total Repair (\$)		
		Need	Performed	Deferred	Need	Performed	Deferred	Need	Performed	Deferred
Welder (Miller 4D)	137281	0	0	0	1,500	0	1,500	1,500	0	1,500
Loader (Cat 938G)	137286	2,000	50	1,950	4,000	0	4,000	6,000	50	5,950
Farm Tractor (Ford 5800)	137282	0	0	0	1,500	0	1,500	1,500	0	1,500
Router (Router 200)	170404	0	0	0	2,500	0	2,500	2,500	0	2,500
Roller ( IR DD-24)	170435	1,500	0	1,500	2,500	0	2,500	4,000	0	4,000
Rosco Broom	170437	1,500	0	1,500	2,500	0	2,500	4,000	0	4,000
Loader(Cat IT-28)	170447	2,000	25	1,975	4,000	0	4,000	6,000	25	5,975
Router (Router 200)	170467	1,000	0	1,000	1,500	0	1,500	2,500	0	2,500
Mower (Alamo Hydro 15)	170468	3,000	50	2,950	4,000	0	4,000	7,000	50	6,950
Aplicator (Crafoo)	170469	3,000	80	2,920	3,500	0	3,500	6,500	80	6,420
2 Ton Truck (Ford)	170484	1,500	37	1,463	3,000	0	3,000	4,500	37	4,463
Mower (Alamo Hydro 15)	21381	3,000	50	2,950	4,000	0	4,000	7,000	50	6,950
Moter Grader (Cat 140H)	214448	4,000	215	3,785	5,000	0	5,000	9,000	215	8,785
Farm Tractor (JD 5310)	214541	2,000	128	1,872	3,000	0	3,000	5,000	128	4,872
Backhoe (Cat 428C)	215336	2,000	32	1,968	3,000	0	3,000	5,000	32	4,968
Welder (Miller Bobcat)	22221	250	0	250	1,000	0	1,000	1,250	0	1,250
Router (Router 200)	250115	1,000	0	1,000	1,500	0	1,500	2,500	0	2,500
Router (Router 200)	250116	1,000	0	1,000	1,500	0	1,500	2,500	0	2,500
Farm Tractor (JD 6310)	52007	2,000	152	1,848	3,000	0	3,000	5,000	152	4,848
Steel / Tire Roller (Cat335D)	520301	1,000	0	1,000	2,000	0	2,000	3,000	0	3,000
Skitster (Cat 248B)	52065	500	0	500	2,000	0	2,000	2,500	0	2,500
D-TRUCK (Sterling)	I-114734	1,500	50	1,450	2,000	0	2,000	3,500	50	3,450
D-TRUCK (Sterling)	I-262733	1,500	50	1,450	2,000	0	2,000	3,500	50	3,450
Aplicator (Crafoo)	I-45000	3,500	0	3,500	3,000	0	3,000	6,500	0	6,500

1 of 13

Done Unknown Zone

Start Paul Sunw... 3 Micros... 8 Micros... Final 81-8... 3 Intern... FY09\_CR ... 7:38 AM



# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX D    LEVEL OF SERVICE MANUAL**





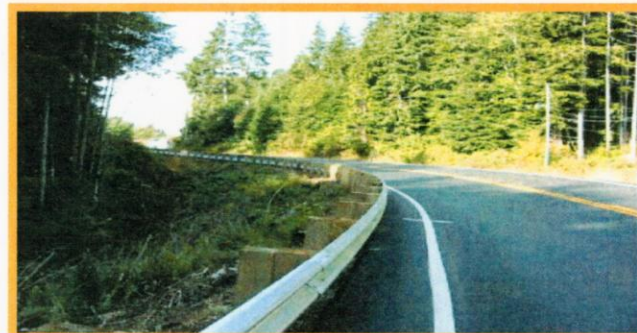
DOI/ Division of Transportation  
DEPARTMENT OF ROADS  
911 NE 11TH AV  
PORTLAND, OR 97232-4128



**BIA**

*ENVISION THE ROADWAY OF TOMORROW*

CONDITION RATING OF SERVICE LEVELS  
for  
ROADS (PAVED/UNPAVED) & BRIDGES



When assessing the value of any treatment to the pavement, research should measure those factors that relate to customer-driven issues such as safety, comfort, convenience, or life-cycle costs.

This process begins with an inspection of the roadway and all associated safety features:

The overall condition of roads and bridges should include, but is not limited to the inspection of: 1) roadway surface 2) shoulders 3) culverts 4) ditches and drainage 5) roadside appurtenances/guardrail 6) traffic signs 7) pavement markings and 8) traffic patterns

Inspection in these areas offers a method of determining pavement or surface deficiencies and related safety feature conditions, through observing and recording the presence of specific types and severities of defects or distresses. The elements of pavement condition rating are as follows:

A) type of defect B) severity of the defect C) extent to which the road surface is affected by the defect.

Using correct and appropriate performance measures is *key* to the success of pavement preservation. Performance measures must reflect the purpose of the prescribed activity. Treatments, like a fog seal, are intended to delay pavement aging not to enhance a pavement's strength.

Many treatments "cover up" or "mask" real distress. The goal is to make sure our pavement preservation treatments are **treating the cause of the problem(s) not just the symptoms.**

### **PAVED/UNPAVED - Roadway Maintenance and Operations**

**Level 1:** This is a very high maintenance service level in which the roadway and associated features are in **excellent** condition. All systems are operational and users experience no delays.

At this maintenance service level, very few deficiencies are present and the overall appearance is pleasing. Preventive maintenance is practiced in all maintenance activities resulting in overall low life-cycle costs and pleasing appearance. Routine activities take place on a regular basis, requiring minimal corrective maintenance activities. (as represented in the guide sheets)

**Level 2:** This is a high maintenance service level in which the roadway and associated features are in **good** condition. All systems are operational. Users may experience occasional delays.

At this maintenance service level, very few deficiencies are present in safety and investment protection activities, but moderate deficiencies exist in all other areas. Preventive maintenance is practiced for safety-related work, is deferred in other areas, resulting in additional routine and corrective maintenance measures. Corrective maintenance of all elements is handled in a timely manner. Life-cycle costs for maintenance activities are generally low. (as represented in guidesheets)

**Level 3:** This is a medium maintenance service level in which the roadway and associated features are in **fair** condition. Systems may occasionally be inoperable and not available to users. Short-term delays may be experienced when repairs are being made, but would not be excessive.

At this maintenance service level, very few deficiencies are present in safety related activities, but moderate deficiencies exist for investment protection activities and significant aesthetic related deficiencies. Preventive maintenance is deferred for most activities except safety-critical work. More emphasis is placed on routine maintenance activities, and corrective maintenance occurs as necessary. A backlog of deficiencies begins to build up that will have to be dealt with eventually, at a higher cost. Some roadway structural problems begin to appear due to long-term deterioration of the system. There is a noticeable [decrease] in appearance. (as represented in guidesheets)

**Level 4:** This is a low maintenance service level in which the roadway and associated features are kept in generally **poor** condition. System failures occur regularly because it is impossible to react in a timely manner to all problems. Occasionally delays may be significant.

At this maintenance service level, moderate deficiencies are present in safety related activities, and significant deficiencies for all other activities. Little preventive maintenance is accomplished. Maintenance has become very reactionary and places emphasis on

correcting problems as they occur. A significant backlog of deficiencies will begin to build up that will have to be dealt with eventually, at a much higher cost. Safety problems begin to appear that increase risk and liability, and significant roadway structural deficiencies exist that accelerate the long-term deterioration of the system. The overall appearance is very poor. (as represented in the guidesheets)

**Level 5:** This is a very low maintenance service level in which the roadway and associated features are kept in **very poor to failing** condition. A backlog of system failures would occur because it is impossible to react in a timely manner to all problems. Significant delays occur on a regular basis.

At this maintenance service level, significant deficiencies are present in all maintenance activities. The overall appearance is not aesthetically pleasing. Preventive maintenance is not realistic for any maintenance activity. Maintenance is totally reactive, and places emphasis on correcting problems after they occur. Significant backlogs of maintenance treatments are not enough to correct the deficiencies that exist, necessitating additional high-cost remedial construction preservation projects in the future. Overall maintenance operations are at their highest life-cycle cost. (as represented in guidesheets)

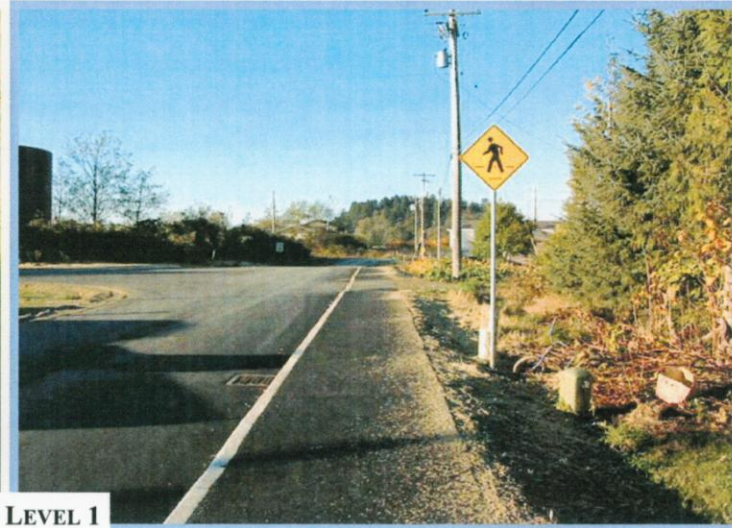


**SERVICE LEVEL (1):** Pavement has no unrepaired potholes, ruts, or unsealed cracks. Utility patching is minimal and no settlement of the pavement. There is no drop-off at the pavement edge. The shoulder is generally clean and free of debris. No noxious weeds, nuisance vegetation, or vegetation obstructions. All pavement striping, signs, and delineators are highly visible at night. Ditch lines, guardrail, highway signs, and sight lines are completely visible. Ditches and culverts flow freely. Storm drains are free of blockages, and slopes are stable. Guardrail is sound and functional.





SERVICE LEVEL 1



**SERVICE LEVEL (2):** Pavement has a minor amount of unrepaired potholes, ruts, or unsealed cracks. Utility patching and minor settlement in pavement may be present. A minimal amount of drop-off and minor erosion at pavement edge is noticeable. The paved shoulder contains a small amount of debris build-up at the edge. Roadside has a minor amount of visible litter, noxious weeds, nuisance vegetation, or vegetation obstructions. Ditch lines guardrail, signs, and sight lines are slightly obscured by encroaching vegetation. Ditches and culverts have moderate silt and debris build-up. Storm drains have minor blockages. Minor pooling of water may occur during normal storm events. A small amount of striping, signs and/or delineators have lost some night reflectivity, are worn or missing. Guardrail has sustained minor visible damage, but is functionally sound.







SERVICE LEVEL 2

**SERVICE LEVEL (3):** Pavement has a moderate amount of unrepaired potholes, ruts, or unsealed cracks. A moderate amount of drop-off has developed at the pavement edge with some erosion visible. The paved shoulder contains a noticeable debris build-up that may be unsightly. Roadside has a moderate amount of litter, noxious weeds, nuisance vegetation, or vegetation obstructions. Vegetation is starting to encroach on the pavement edge, moderately obscuring ditch lines, guardrail, signs, and sight lines. Ditches and culverts have moderate silt and debris build-up. Storm drains have moderate blockages and slopes have moderate erosion or slides. Some standing water on shoulder and in ditches during major storm events. A moderate amount of striping, signs and delineators have lost some night reflectivity, are worn or missing. Guardrail is functionally sound, but has sustained moderate visible damage and some structural deterioration.





**SERVICE LEVEL 3**



**SERVICE LEVEL (4):** Pavement has a significant amount of unrepaired pot-holes, ruts or unsealed cracks. A significant drop-off has developed at the pavement edge with noticeable erosion. The paved shoulder contains significant debris that would restrict bicycle or pedestrian use, and be unsightly. The roadside has a significant amount of visible litter, noxious weeds, nuisance vegetation, or vegetation obstructions. Vegetation is encroaching on the pavement edge, significantly obscuring ditch lines, guardrail, signs and sight lines. Ditches and culverts have significant silt and debris build-up. Significant amount



of striping, signage, and delineators have lost night reflectivity, are worn or missing. Guardrail has sustained significant visible damage and moderate structural deterioration. Storm drains have significant blockages. Erosion or slides may encroach or threaten the roadway. Standing water visible in the travel lane(s) during a normal storm event.



SERVICE LEVEL 4

**SERVICE LEVEL (5):** Pavement has an extensive amount of unrepaired potholes, ruts, or unsealed cracks. Extensive erosion or drop-off has developed at the pavement edge. The paved shoulder contains debris build-up that would prevent bicyclist and pedestrian use, be a hazard to unsightliness. Roadside has an amount of visible litter, nuisance vegetation, or obstructions. Vegetation on the pavement, extends ditch lines, guardrail, sight lines. Extensive ingrowth, signs, and delineators have lost night reflectivity, are worn or missing. Significant traffic signal, lighting, or other traffic operational systems must be turned off or shut down.. Guardrail has sustained extensive visible and structural damage. Ditches and culverts have extensive silt and debris





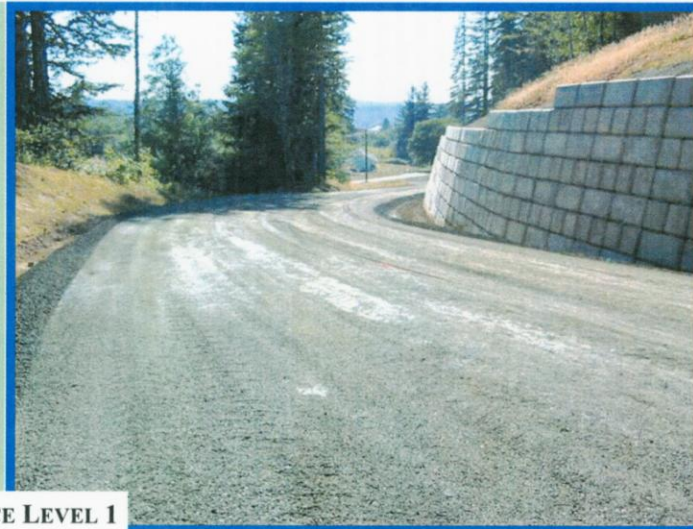
### Rating of Maintenance Activity on BIA owned Roads

Condition Rating	Striping	Pavement Edge	Pot Holes	Signs	Vegetation	Drainage	Guardrail
<b>1</b> Excellent	Clearly Visible	No drop off	Level Patches	Highly Reflective	Well Maintained	Free Flowing	Sound Functional
<b>2</b> Good	90% Reflected on 80%	1" Max	Settled Patches (1" Max, <10% Area)	Less 10% Obscured	Heavy Growth	Less 1/4 Blocked	Minor Dents
<b>3</b> Fair	75% Reflected on 80%	2" Max	Unfilled (Less 10% Area)	More 10% Obscured	Starting to Encroach	Less 1/3 Blocked	Some Structural Deterioration
<b>4</b> Poor	50% Reflected on 80%	3" Max	Unfilled (Less 25% Area)	Non Standard Conditions	Significant Encroachment	Less 1/2 Blocked	Old Standard or Major Dents, Some Posts Tilted
<b>5</b> Failing	<50% Reflected on 80%	Over 3"	Unfilled (More 25% Area)	Missing Signs	Heavy Encroachment	More 1/2 Blocked	Major Damaged Rails or Posts Broken

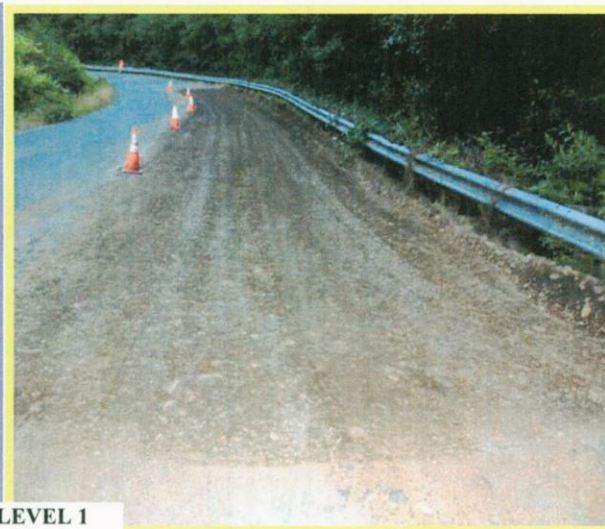
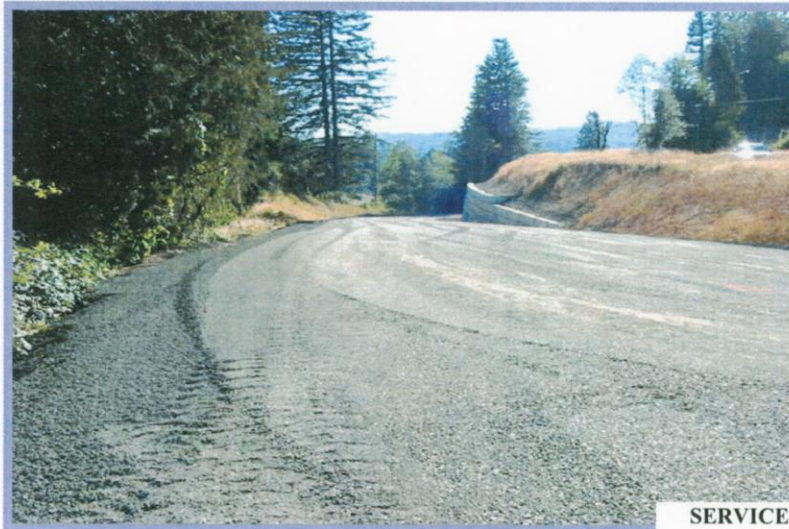
Safety carries a greater weight than preservation of infrastructure (preserve life then preserve property)

UNPAVED





SERVICE LEVEL 1

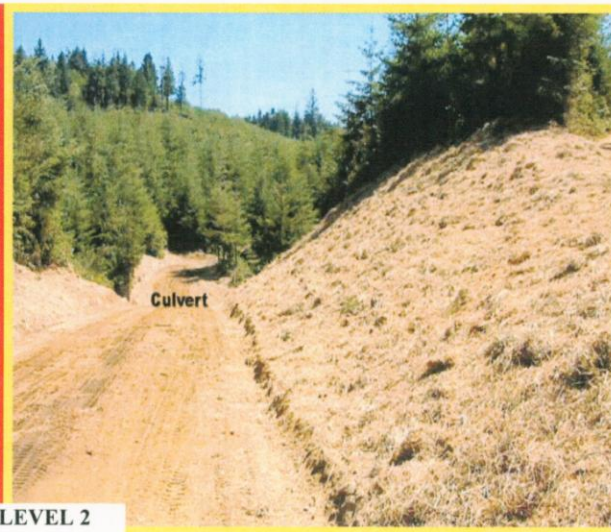
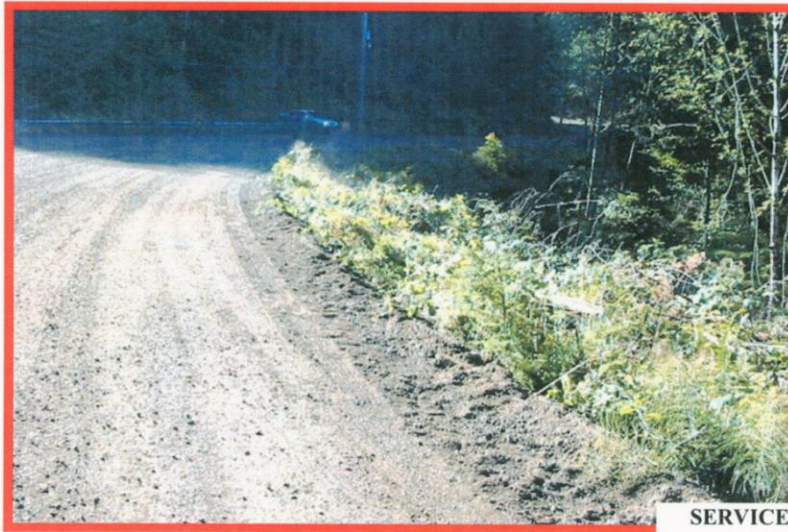


SERVICE LEVEL 1

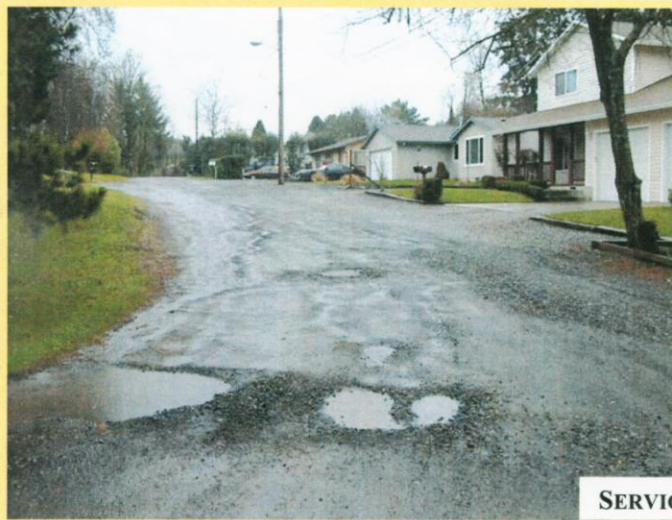


SERVICE LEVEL 2





SERVICE LEVEL 2



SERVICE LEVEL 3



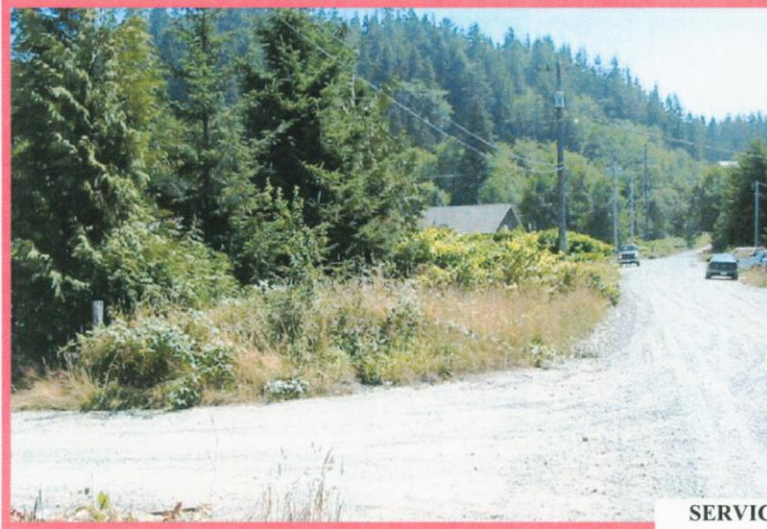
SERVICE LEVEL 3





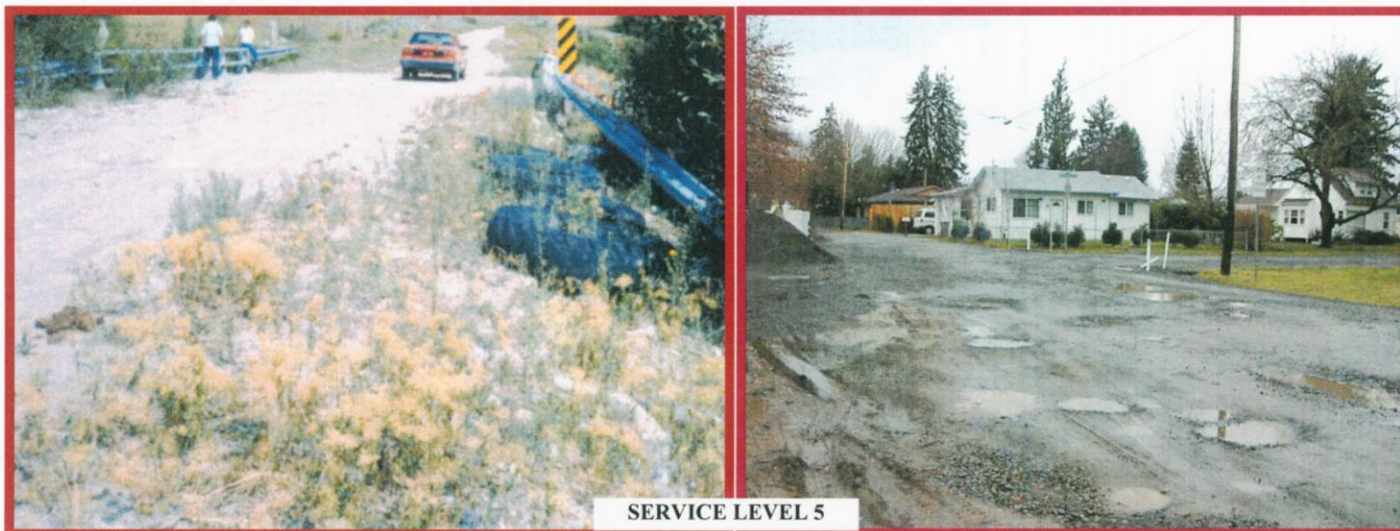


SERVICE LEVEL 4

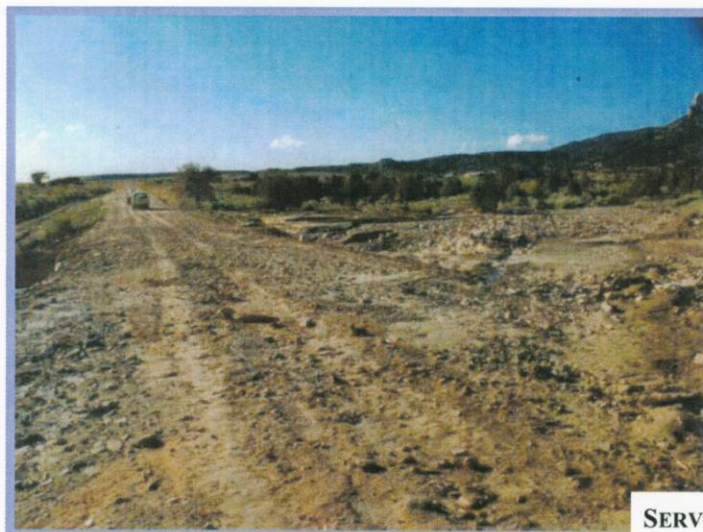


SERVICE LEVEL 4





SERVICE LEVEL 5

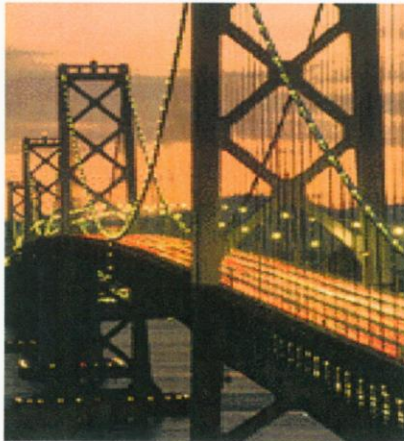


**SERVICE LEVEL 5**

### Rating of Maintenance Activity on BIA owned Roads

Condition Rating	Corrugation \Pot Holes	Signs	Vegetation	Drainage	Guardrail
<b>1</b> Excellent	Smooth Hard Surface	Highly Reflective	Well Maintained	Free Flowing	Sound Functional
<b>2</b> Good	Minor Corrugation or Ravelling	Less 10% Obscured	Heavy Growth	Less 1/4 Blocked	Minor Dents
<b>3</b> Fair	Some Corrugation /Ravelling /Pot Holes	More 10% Obscured	Starting to Encroach	Less 1/3 Blocked	Some Structural Deterioration
<b>4</b> Poor	Surface Corrugated w\ Pot Holes	Non Standard Conditions	Significant Encroachment	Less 1/2 Blocked	Old Standard or Major Dents, Some Posts Tilted
<b>5</b> Failing	Major Pot Holes w\Corrugation	Missing Signs	Heavy Encroachment	More 1/2 Blocked	Major Damaged Rails or Posts Broken

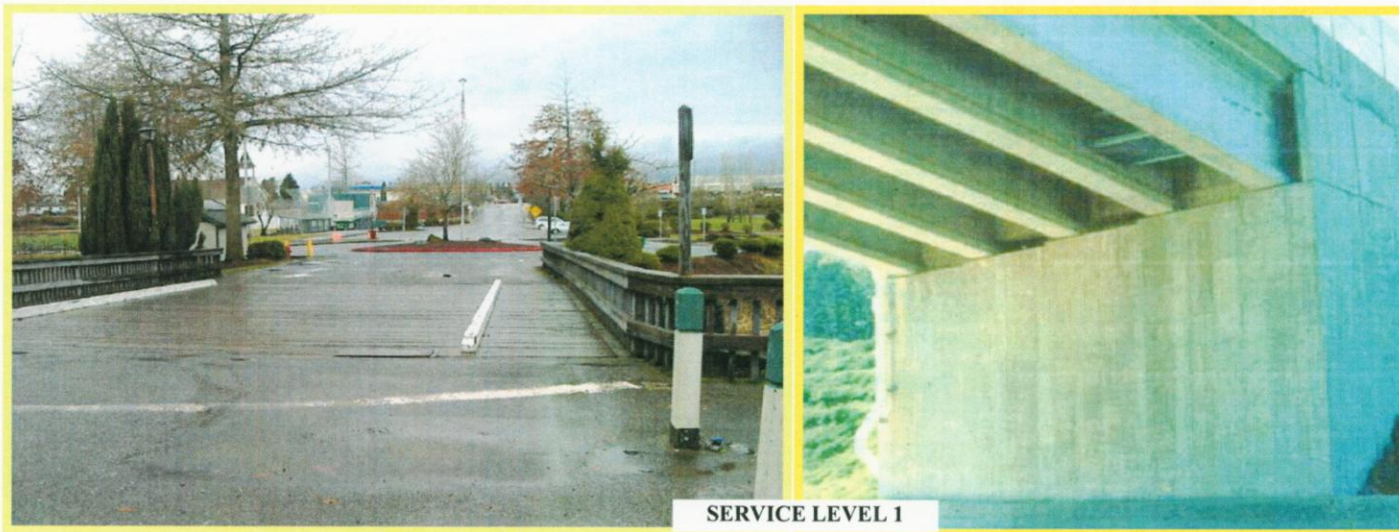
Safety carries a greater weight than preservation of infrastructure  
(preserve life then preserve property)



# BRIDGES



SERVICE LEVEL	DECKS & SIDEWALKS	GRATES & DRAINS	RAILS, GIRDERS, TRUSSES, PIERS & ABUTMENTS
CONDITION 1	Free of visible sand and debris	Grates and drains free of sand and debris	Free of moss, dirt, debris , graffiti and bird guano
CONDITION 2	10% of surface area covered with sand and debris	5% or less of grates & drains blocked or partially blocked	10% or less of bridge surface contains spots, stains, dirt, debris, graffiti, or bird guano
CONDITION 3	20% of surface area covered with sand or debris	10% or less of grates & drains blocked or partially blocked	30% or less of bridge surfaces contain spots, stains, dirt, debris, graffiti, or bird guano
CONDITION 4	40% of surface area covered with sand or debris	20% or less of grates & drains blocked or partially blocked	50% or less of bridge surfaces contain spots, stains, dirt, debris, graffiti or bird guano
CONDITION 5	>40% of surface area covered with sand or debris	>20% of grates & drains blocked or partially blocked	>50% of bridge surfaces contain spots, stains, dirt, debris, graffiti, or bird guano



SERVICE LEVEL 1



SERVICE LEVEL 2





SERVICE LEVEL 3







SERVICE LEVEL 4



SERVICE LEVEL 5

To determine the service level a bridge should be categorized, use the following thresholds as your guideline.

SERVICE LEVEL					
CONDITION TOTAL = DECK & SIDEWALK CONDITION + GRATE & DRAIN CONDITION + RAIL, GIRDER, TRUSS, PIER, & ABUTMENT CONDITION					
Dirty bridge surfaces and sidewalks. Blocked bridge drains. Graffiti, spots, stains, dirt or bird guano	<u>Level 1</u>	<u>Level 2</u>	<u>Level 3</u>	<u>Level 4</u>	<u>Level 5</u>
<b>Total Bridge condition rating number equals</b>	4 or less	7 or less	10 or less	13 or less	> 13

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX E    REPORTS**

- Illustration 8:    Summary of Reports by Road Maintenance Program
- Illustration 9:    Road Maintenance Needs Inventory Report 581
- Illustration 10:   Road Maintenance Budget Need Report 582
- Illustration 11:   Road Maintenance Planning & Accomplishment  
Report 583
- Illustration 12:   Equipment Needs Report 584
- Illustration 13:   Sample Summary Report

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX E    REPORTS**

Illustration 8:    Road Maintenance Reports Summary

## ROAD MAINTENANCE Reports

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### 4. REPORTS

#### Reports Required by the BIA Roads Maintenance Program.

##### A. Field Office Reports.

1. Road Maintenance Needs Inventory Report, FORM BIA-581. This report identifies all route specific types of recurring and backlogged maintenance needs on all eligible roads and bridges and is intended to be used to generate the annual Road Maintenance Program budget justifications.
2. Road Maintenance Budget Need Report, FORM BIA-582. Each year the Field Offices shall submit a planning budget request for the Current Year plus two, based on needs identified in the FORM BIA-581. FORM BIA-582 shall be prepared by the Field Offices and reviewed and summarized by the BIA Area Offices. The summary and reports shall be submitted to the Division of Transportation no later than March 15 of the current year. The Central Office Division of Transportation will then prepare a national summary for annual budget justifications.
3. Road Maintenance Planning and Accomplishment Report, FORM BIA-583. Each October, with quarterly updates, Field Office shall prepare and submit for Area Office review, FORM BIA-583 to monitor and take corrective actions if necessary.
4. Equipment Need Report, FORM BIA-584. This form is used to identify all road maintenance equipment needs required to provide a minimum level of acceptable maintenance on all eligible roads and bridges.

- ##### B. Summary of Reports by BIA Road Maintenance Program.
- Lists all reports included in this supplement by report titles. It lists required reports and indicates when and where reports must be sent. All reports should be originated at the Field office level and concurred by the Area office before submission to the Central Office.

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX E    REPORTS**

Illustration 9:    Road Maintenance Needs Inventory Report 581

## ROAD MAINTENANCE NEEDS INVENTORY

AREA AGCY RESV RTE # LENGTH RTE/NAME CONGR ST SURF DATE

Act. Code	Activity Description	Work Units	Quantity (A)	Labor \$/unit (B)	Equip \$/unit (C)	Mat'l \$/unit (D)	Labor \$ AxB	Equip \$ AxC	Mat'l \$ AxD	TOTAL \$ E+F+G
10	Road Inspection	Mile		1.53	0.26	-----				
11	Blading & Reshaping	Mile		32.00	117.00	-----				
12	Crack Sealing	Mile		250.00	47.80	48.83				
13	Patching Surface (potholes)	Tons		107.00	35.67	30.00				
14	Spot Seal Coating	SqYd		0.32	0.04	0.33				
15	Repairing Base	CY		40.00	60.30	10.00				
16	Shoulder Maint.	Mile		40.00	758.90	16.90				
17	Approach Work	Each		20.00	72.90	-----				
18	Surface Cleaning	SqYd		.0011	0.03	-----				
20	Drain. Struct. Insp.	Each		10.00	0.01	-----				
21	Clean & Reshape Ditches	Mile		160.00	583.60	-----				
22	Clean Drain. Struct.	Each		30.00	35.00	-----				



## ROAD MAINTENANCE NEEDS INVENTORY

AREA AGCY RESV RTE # LENGTH RTE/NAME CONGR ST SURF DATE

Act. Code	Activity Description	Work Units	Quantity (A)	Labor \$/unit (B)	Equip \$/unit (C)	Mat'l \$/unit (D)	Labor \$ AxB	Equip \$ AxC	Mat'l \$ AxD	TOTAL \$ E+F+G
23	Repair Drain	EachE		Based	on Actua	Actual C	Cond's	on Site		
24	Repair Curb & Gutter	LF		\$12	per FT	Total	Unit	Cost		
25	Repair Maint Outside R/W	Each		Based	on	Actual	Cond's	on Site		
26	Drainage Improvements	JOB		Based	on	Actual	Cond's	on Site		
30	Bridge Insp	Each		40.00	20.00	-----				
31	Bridge Deck Repair & Insp	SqFt		Based &	on Bridge	Actual Reports	Cond's	on Site		
32	Bridge Superstructure Repair	Job		Based &	on Bridge	Actual Reports	Cond's	on Site		
33	Birdge Substructure Maint	Job		Based &	on Bridge	Actual Reports	Cond's	on Site		
34	Channel Maint	Job		Based &	on Bridge	Actual Reports	Cond's	on Site		

## ROAD MAINTENANCE NEEDS INVENTORY

AREA    AGCY    RESV    RTE #    LENGTH    RTE/NAME    CONGR    ST    SURF    DATE

Act. Code	Activity Description	Work Units	Quantity (A)	Labor \$/unit (B)	Equip \$/unit (C)	Mat'l \$/unit (D)	Labor \$ AxB	Equip \$ AxC	Mat'l \$ AxD	TOTAL \$ E+F+G
40	Mowing/Veg Control	Acre		20.00	15.00	-----				
41	Litter Pickup	Mile		120.00	66.67	-----				
42	Brush & Tree Removal	Acre		61.50	55.38	-----				
50	Traffic Control Insp	Mile		1.33	0.26	-----				
51	Sign Maintenance	Each		21.33	18.67	60.00				
52	Delineator Maint	Each		3.20	0.02	5.00				
53	Striping	Mile		\$1000	per MI	Total	Unit	Cost		
54	Signal & Lighting Maint	Each		Based	on	Actual	Cond's	on Site		
60	Guiderail Maint	LF		\$20	per LF	Total	Unit	Cost		
61	Fence Repair	LF		\$3	per LF	Total	Unit	Cost		
62	Cattle Guard Clean & Repair	Each		40.00	3.00	-----				
63	Slope Prot & Repa	Each		Based	on	Actual	Cond's	on Site		

## ROAD MAINTENANCE NEEDS INVENTORY

AREA AGCY RESV RTE # LENGTH RTE/NAME CONGR ST SURF DATE

Act. Code	Activity Description	Work Units	Quantity (A)	Labor \$/unit (B)	Equip \$/unit (C)	Mat'l \$/unit (D)	Labor \$ AxB	Equip \$ AxC	Mat'l \$ AxD	TOTAL \$ E+F+G
64	Sidewalk Repair	SqFt		\$10	per SF	Total	Unit	Cost		
70	Winter Preparation	Hour		60.00	35.00	250.00				
71	Snow & Ice Control	Mile		2.66	22.45	27.50				
72	Washout Repair	Each		Based	on	Actual	Cond's	on Site		
73	Slide Repair	Each		Based	on	Actual	Cond's	on Site		
75	Ferry Maint	Hour		\$228	per HR	Total	Unit	Cost		
97	Work for Others	Hour		-----	-----	-----				

99 Program Admin. LS

Subtotal =  
6% of Subtotal =  
Grand Total =

A \_\_\_\_\_  
Prepared By Date

C \_\_\_\_\_  
Superintendent Date

B Information Reviewed \_\_\_\_\_  
With Tribal Representative Date

D \_\_\_\_\_  
Area Road Engineer Date

**INSTRUCTIONS FOR COMPLETING FORM BIA-581, ROAD MAINTENANCE NEEDS INVENTORY REPORT**

This report identifies all route specific types of recurring and backlogged maintenance needs on all eligible roads and bridges and is intended to be used to generate the annual Road Maintenance Program budget justifications.

- (1) **AREA, AGENCY, RESERVATION, STATE, CD NAMES AND CODES, etc:** Enter name of the Area, Agency and Reservation and single Alpha Area Code -2 digit numeric code for Agency - 3 digit numeric code for Reservation. The names and numeric codes for Areas, Agencies and Reservations are those listed in Section 3.1 of this Supplement. A separate form must be completed for each RTE and if needed, for each different SURF type within the RTE. A separate form must also be completed for each BRDG on each RTE. Enter the DATE each form was prepared. For definitions of Surface Types see Section 1.6F of the 58 BIAM.
- (2) **ACT. CODE:** This identifies those codes listed in Section 2.1 of this supplement to be used for the Activity described for use in the Maintenance Management System.
- (3) **QUANTITY:** Enter the quantity of work units for the described activity that you plan on completing for the current year. Multiple repetitions of an activity should be considered and entered into the quantity based on your local environmental, climatic, and traffic conditions.
- (4) **UNIT COSTS:** Average unit costs for LABOR, EQUIPMENT and MATERIALS have been calculated for most of the activities on the FORM BIA-581. Those activities with no calculated average unit costs provided are unique to local conditions and must be determined by the local Field Office based on local conditions affecting LABOR, EQUIPMENT and MATERIALS.
- (5) **Extend LABOR, EQUIPMENT and MATERIALS costs** by multiplying the unit cost for each by the QUANTITY and enter into the proper columns. The extended LABOR, EQUIPMENT and MATERIALS costs added together is the total cost for that activity.
- (10) **Obtain signatures with dates and furnish each a copy.**

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX E    REPORTS**

Illustration 10:   Road Maintenance Budget Needs Report 582

**PROPOSED - FISCAL YEAR<sup>1</sup> 19\_\_ ROAD MAINTENANCE BUDGET NEED**

AREA \_\_\_\_\_

AGENCY \_\_\_\_\_

RES ID \_\_\_\_\_

\$	Area Program Supervision	
\$	Agency Program Supervision	
\$	Snow and Ice Control	
\$	Other Emergency Maintenance	
\$	Bridge Maintenance	_____ LF
\$	Pavement Maintenance	_____ miles
\$	Gravel Maintenance	_____ miles
		School Bus Route miles
\$	Improved Earth Roads	_____ miles
		School Bus Route miles
\$	Unimproved Earth Roads	_____ miles
		School Bus Route miles
\$	Walkways/Pathways (Maint. Existing)	
\$	Airstrip Maintenance	
\$	Equipment Needs (Itemize on attached sheet & BIAM-584)	
\$	Other Maintenance (Ferry O&M, etc)	
\$	Total Proposed	

A. \_\_\_\_\_

Prepared by

Date

B. \_\_\_\_\_  
Information Reviewed With

Tribal Representative

Date

C. \_\_\_\_\_

Superintendent

Date

D. \_\_\_\_\_

Area Road Engineer

Date

1. Proposed Fiscal Year is current year + two years.

**INSTRUCTIONS FOR COMPLETING FORM BIA-582, ROAD MAINTENANCE BUDGET NEED REPORT**

This report is used in a national summary and required in order to justify annual Road Maintenance Program budget requests and is intended to identify the actual recurring and backloged needs identified in the Road Maintenance Needs Inventory.

- (1) Costs entered shall include those cost data identified, categorized and summarized from FORM BIA-581, ROAD MAINTENANCE NEEDS INVENTORY.
- (2) AREA, AGENCY, RESERVATION NAMES and CODES: Enter name of the Area, Agency and Reservation and single Alpha Area Code -2 digit numeric code for Agency - 3 digit numeric code for Reservation. The names and numeric codes for Areas, Agencies and Reservations are those listed in Section 3.1 of this Supplement.
- (3) AREA: Enter Appropriate Name.
- (4) FISCAL YEAR: Enter the Appropriate Year (current year + 2 yrs)
- (5) AREA PROGRAM SUPERVISION: This line is for general supervision at the Area level program. This will normally be filled in by the Area Office. This amount includes time, office costs, travel costs to prepare and review budgets, work accomplishments, and other summaries and reports at the Area level, consultations for technical assistance and coordination and presentation of training for Field Offices.
- (6) FIELD OFFICE SUPERVISION: This line is for general supervision at the reservation level program. This includes time, office costs and vehicle costs to prepare budgets, schedule work accomplishments, and prepare summary reports of work. Otherwise known as General Operations.
- (7) SNOW AND ICE CONTROL: This amount is the average annual expenditure for the past five years.
- (8) OTHER EMERGENCY MAINTENANCE: This amount includes washouts and landslides on the same five year basis as snow and ice control.
- (9) BRIDGE MAINTENANCE: This amount shall be in accordance with the recommendations, as amended, of the Bridge Inspection reports. Enter the total number of Lineal Feet (FT) to be maintained.

- (10) **ROUTINE MAINTENANCE:** By surface type is reported by each mile of public roads regardless of the number of passes your equipment makes on that mile. For gravel, earth and unimproved earth roads, those miles which are school bus routes are listed again for priority purposes. For definitions of Surface Types see Section 1.6 F of the 58 BIAM.
- (11) **AIRSTRIp MAINTENANCE:** This cost should be developed on a cost basis comparable to road maintenance. It does not include reconstruction, construction, building maintenance, or airport operation. See Section 2.ID of this BIAM for further clarification.
- (12) **EQUIPMENT NEEDS:** Attach FORM BIA-584 Equipment Needs Request for equipment costs identified.
- (13) **FERRY O&M:** Material purchases as signs, gravel, etc. are not to be included. Proposals under this item must be in detail and justified as Ferry Operation and Maintenance.

All figures should be rounded to the nearest \$100 and the nearest mile.



# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX E    REPORTS**

Illustration 11: Road Maintenance Planning & Accomplishment Report  
583

## FY \_\_\_\_ ROAD MAINTENANCE PLANNING AND ACCOMPLISHMENT REPORT

AREA \_\_\_\_\_

AGENCY \_\_\_\_\_

RES /TRIBE ID \_\_\_\_\_

WORK ITEM	WORK UNITS	TOTAL QUAN. IDENT (\$000)	ACTUA F.Y. PLAN (\$000)	FIRST QTR.		SECOND QTR.		THIRD QTR.		FOURTH QTR.		TOTAL
				PLAN	ACPL	PLAN	ACPL	PLAN	ACPL	PLAN	ACPL	
Program Admin.												
Snow and Ice Control												
Other Emerg. Maint.												
Bridge Maint.												
Paved Maint.												
Gravel Maint.												
Imprv. Earth Maint.												
Unimpv. Earth Maint.												
Walk/Path Maint.												
Airstrip Maint.												
Other Maint.												

Prepared By \_\_\_\_\_

DATE \_\_\_\_\_

Agency/Tribe

Concur \_\_\_\_\_

DATE \_\_\_\_\_

Superintendent

Concur \_\_\_\_\_

DATE \_\_\_\_\_

**INSTRUCTIONS FOR COMPLETING FORM BIA-583, ROAD MAINTENANCE PLANNING AND ACCOMPLISHMENT REPORT**

This report is used to plan and monitor maintenance activities and take corrective actions if necessary.

- (1) **AREA, AGENCY, RESERVATION NAMES AND CODES:** Enter name of the Area, Agency and Reservation and single Alpha Area Code -2 digit numeric code for Agency - 3 digit numeric code for Reservation. The names and numeric codes for Areas, Agencies and Reservations are those listed in Section 3.1 of this Supplement.
- (2) **AREA:** Enter Appropriate Name.
- (3) **FISCAL YEAR:** Enter the Appropriate Year.
- (4) **INVENT REQ'D:** Enter the total dollar amounts shown from FORM BIA-581 for work items listed. (Amounts entered in thousands of dollars to nearest thousand)
- (5) **FY PLAN:** Enter planned FY dollars amount, based on current FY budget, for work items listed.
- (6) **QTR PLAN AMOUNT:** See item # 5 above.
- (7) **QTR ACT AMOUNT:** Enter actual amount.
- (8) **Total amount expended.**

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX E    REPORTS**

Illustration 12:   Equipment Needs Report 584

**EQUIPMENT NEEDS REPORT**

AREA \_\_\_\_\_

AGENCY \_\_\_\_\_

RES ID \_\_\_\_\_

Equipment Type: \_\_\_\_\_ Is this  
 equipment \_\_\_\_\_ additional \_\_\_\_\_ replacement \_\_\_\_\_ or requiring major repair?

If replacement, complete the following:

Year manufactured \_\_\_\_\_, Make \_\_\_\_\_, Model \_\_\_\_\_,  
 Serial number \_\_\_\_\_, BIA tag number \_\_\_\_\_,  
 Year acquired \_\_\_\_\_, Present Condition \_\_\_\_\_, Total hours used \_\_\_\_\_,  
 (Use GSA Condition Code)

Last 5 year equipment utilization rate \_\_\_\_\_ average hours/year.

- 1) Expected utilization rate of this new equipment \_\_\_\_\_ hours per year.
- 2) Expected maintenance costs of this new equipment \_\_\_\_\_ per year.
- 3) Attach your specifications for the equipment, and/or special attachments and/or component you are requesting.
- 4) Funding Requirement (additional/replacement):
 

a. estimated equipment cost	\$	
b. special attachments and/or components	\$	
c. transportation or delivery cost	\$	
subtotal	\$	
d. less trade-in	\$	
Total Funds Needed	\$	_____
- 5) Repair Requirements Costs: \$ \_\_\_\_\_
- 5) Give complete justification for this NEED (use attachment if needed)

Requestor \_\_\_\_\_, Title \_\_\_\_\_

Date \_\_\_\_\_

Recommend: \_\_\_\_\_ Concur: \_\_\_\_\_

Area Road Engineer \_\_\_\_\_ Date \_\_\_\_\_

Area Director \_\_\_\_\_

Date \_\_\_\_\_

**INSTRUCTIONS FOR COMPLETING FORM BIA-584, EQUIPMENT NEEDS REPORT**

This report is used to identify all road maintenance equipment needs required to provide a minimum level of acceptable maintenance on all eligible roads and bridges.

- (1) **AREA, AGENCY, RESERVATION NAMES AND CODES:** Enter names of the Area, Agency and Reservation and single Alpha Area Code -2 digit numeric code for Agency - 3 digit numeric code for Reservation. The names and numeric codes for Areas, Agencies and Reservations are those listed in the Section 3.1 of this Supplement.
- (2) **EQUIPMENT TYPE:** Identified type equipment by common name, i.e. Grader.
- (3) **IS THIS EQUIPMENT:** Indicate whether the requested equipment will be a replacement or an additional piece, piece requiring major repair, or replacement of an existing piece of equipment.
- (4) **IF REPLACEMENT:** Fill in all blanks as indicated. For "present condition" use the GSA Condition Code.
- (5) **EXPECTED UTILIZATION RATE OF THIS EQUIPMENT:** Enter the anticipated use during the anticipated life of the equipment.
- (6) **EXPECTED MAINTENANCE COSTS OF THIS NEW EQUIPMENT:** Enter your estimate that includes routine servicing, overhauls, and maintenance of attachments.
- (7) **ATTACH A COPY OF YOUR SPECIFICATIONS FOR THE EQUIPMENT:** Do not forward only a copy of the manufacturer's brochure.
- (8) **TOTAL FUNDS NEEDED:** Enter in dollar amounts to the nearest one hundred dollars estimated cost of the additional or replacement equipment.
- (9) **REPAIR REQUIREMENT COSTS:** Enter on the lines provided the major repairs required and associated costs including labor costs. Then provide a total for these.
- (10) **GIVE COMPLETE JUSTIFICATION FOR THIS REQUEST:** Try to itemize the work load by miles, tons, acres, etc. of need per year. Identify nearest rental location by miles and their rental charges per hour or day. List other possible local users to increase the utilization of this equipment.
- (11) **SIGNATURES:** Have those indicated sign and date this form.

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX E    REPORTS**

Illustration 13:   Sample Summary Report

**SUMMARY OF REPORTS BY ROAD MAINTENANCE PROGRAM**

BIAM FORM NO.	Title	When Prepared	Submit To	Action by Area Office	Action by Central Office
581	Road Maintenance Needs Inventory	As requested	Area Road Engineer within (2) weeks after requesting.	Review and submit by Central Office deadline.	Summarize into national database to justify total maintenance needs report.
582	Road Maintenance Budget Need Report	Before February 1 of current year (for current year + 2)	Area Road Engineer by February 15.	Summarize and send to Central Office by March 15.	Prepare national summary for annual budget justifications.
583	Road Maintenance Plan & Accomplishment Report	Quarterly before: Oct. 31, Jan. 31, Apr. 30, Jul. 31	Area Road Engineer before: Nov. 15, Feb. 15, May 15, Aug. 15.	Summarize and send to Central Office within (2) weeks of submission date at Area Office.	Prepare national summary to monitor program.
584	Equipment Needs Report	As requested	Area Roads Engineer within (2) weeks after requested.	Review and submit to Central Office.	Summarize and prepare national needs report.



# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX F    FORMS**

- Illustration 14: Pavement Surface Condition Rating Form
- Illustration 15: Surface Unit Cost Development Instruction
- Illustration 16: FY 20\_\_ Surface Unit Cost Calculation Form
- Illustration 17: Roadside Cost Development Instructions
- Illustration 18: Roadside Cost Estimate Summary Form
- Illustration 19: Roadside Cost Calculation Form
- Illustration 20: FY 20\_\_ Roadside Unit Cost Calculation Form
- Illustration 21: FY 20\_\_ Equipment Repair Form
- Illustration 22: FY20\_\_ Road Maintenance Accomplishment Form
- Illustration 23: FY20\_\_ Bridge Maintenance Accomplishment Form
- Illustration 24: Road Maintenance Condition Assessment Survey  
Certification and Filing Instructions
- Illustration 25: Road Maintenance Condition Assessment Survey  
Certification

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX F   FORMS**

Illustration 14:   Pavement Surface Condition Rating Form

# Pavement Surface Condition Rating Form

Date \_\_\_\_\_  
Completed By \_\_\_\_\_  
Approved By \_\_\_\_\_

## LOCATION

Region \_\_\_\_\_ Agency/Reservation \_\_\_\_\_  
Agency Code \_\_\_\_\_ Reservation Code \_\_\_\_\_  
Route No. \_\_\_\_\_ Section No. \_\_\_\_\_ Section Length \_\_\_\_\_

## ROADWAY DATA

Surface Type \_\_\_\_\_  
Surface Condition Rating \_\_\_\_\_

Condition \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Treatment  
Measure \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## IMPROVEMENT HISTORY

Year	Work Completed	Estimated Cost

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX F   FORMS**

Illustration 15:   Surface Unit Cost Development Instruction

# Surface Unit Cost Development Instructions

## Paved Surfaces

Develop unit costs on a per mile basis for each complete procedure associated with each treatment measure determined during the surface condition assessment.

Utilize the Highway Maintenance Performance Standards provided herein for work procedures, labor, equipment, and material requirements. Utilize Office of Personnel Management wage rates and the most recent versions of the Equipment Bluebook and R.S. Means as reference sources for cost estimating procedures and to supplement the information provided herein.

Record the unit cost calculations for each complete procedure associated with each treatment measure on the **Surface Unit Cost Calculation Forms**.

## Unpaved Surfaces

Develop a unit cost for grading and one unit cost for a re-graveling operation on a per mile basis.

Utilize the Highway Maintenance Performance Standards provided herein for work procedures, labor, equipment, and material requirements. Utilize Office of Personnel Management wage rates and the most recent versions of the Equipment Bluebook and R.S. Means as reference sources for cost estimating procedures and to supplement the information provided herein.

Record the unit cost calculations for grading and one unit cost for a re-graveling operation on the **Surface Unit Cost Calculation Forms**.

The **Surface Unit Cost Calculation Forms** shall be completed under the guidance of the Regional Road Maintenance Engineer and shall be approved by the Regional Road Maintenance Engineer or the Regional Roads Engineer.

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX F    FORMS**

Illustration 16:   FY 20\_\_ Surface Unit Cost Calculation Form

## Surface Unit Cost Calculation Form

Date \_\_\_\_\_  
Completed By \_\_\_\_\_  
Approved By \_\_\_\_\_

## LOCATION

Region \_\_\_\_\_ Agency/Reservation \_\_\_\_\_  
 Agency Code \_\_\_\_\_ Reservation Code \_\_\_\_\_  
 Route No. \_\_\_\_\_ Section No. \_\_\_\_\_ Section Length \_\_\_\_\_

## ROADWAY DATA

Surface Type\_\_\_\_\_

Surface Condition Rating\_\_\_\_\_

## Surface Activity

[illegible]

**Labor Cost** \_\_\_\_\_

**Equipment Cost** \_\_\_\_\_

**Material Cost** \_\_\_\_\_

**Fuel Cost** \_\_\_\_\_

**Other Costs (Mechanic, parts, etc.)** \_\_\_\_\_

**Total Surface Cost** \_\_\_\_\_

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX F   FORMS**

Illustration 17:   Roadside Cost Development Instructions



# Roadside Cost Development Instructions

Develop the total costs required to complete the activities assessed and recorded on the **Roadside Cost Estimate Summary Forms** for each route section..

Utilize the Highway Maintenance Performance Standards provided herein for work procedures, labor, equipment, and material requirements. Utilize Office of Personnel Management wage rates and the most recent versions of the Equipment Bluebook and R.S. Means as reference sources for cost estimating procedures.

Record the unit cost calculations for roadside activities the **Roadside Unit Cost Calculation Forms**.

The **Roadside Unit Cost Calculation Forms** shall be completed under the guidance of the Regional Road Maintenance Engineer and shall be approved by the Regional Road Maintenance Engineer or the Regional Roads Engineer.

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX F   FORMS**

Illustration 18:   Roadside Cost Estimate Summary Form

## ROADSIDE COST ESTIMATE SUMMARY FORM

Region \_\_\_\_\_ Agency/Reservation \_\_\_\_\_  
 Agency Code \_\_\_\_\_ Reservation Code \_\_\_\_\_  
 Route No. \_\_\_\_\_ Section No. \_\_\_\_\_ Section Length \_\_\_\_\_ Surface Type \_\_\_\_\_

Activity Description	Work Units	(A) Quantity	(B) Quantity of Deferred Maintenance	(C) Labor \$ per Unit	(D) Equipment \$ per Unit	(E) Materials \$ per Unit	(F) Labor \$ (A) x (C)	((G) Equip \$ (A) x (D)	(H) Materia ls \$ (A) x (E)	(I) Total \$ (F)+(G)+(H)	(J) Percent Deferred Maintena nce (B) (A)	(K) Deferred Maintenan ce \$ (I)x(J)
Clean & Reshape Ditches	Mile											
Clean Drainage Structure	Each											
Repair / Replace Drain	Each			base	on	actual	site	conditions				
Drainage Improvemen	Each			base	on	actual	site	conditions				
Mowing / Vegetation Control	Acre											
Litter Pickup	Mile					NA						
Brush Removal	Acre					NA						
Tree Removal	Each					NA						
Sign Maintenance	Each											
Delineator Maintenance	Each											
Striping	Mile			\$	Per	Mile	For	All	striping			
Guardrail Maintenance	LF			\$	Per	LF	total	unit	cost			
Cattle Guard Clean & Repair	Each					NA						
Cattle Guard Replacement	Each											
Slope Protection & Repair	Each			base	on	actual	site	conditions				
Washout Repair	Each			base	on	actual	site	conditions				
Slide Repair	Each			base	on	actual	site	conditions				

Date \_\_\_\_\_ Completed By \_\_\_\_\_ Approved By \_\_\_\_\_

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX F   FORMS**

Illustration 19:   Roadside Cost Calculation Form

# Roadside Cost Calculation Form

Date \_\_\_\_\_  
Completed By \_\_\_\_\_  
Approved By \_\_\_\_\_

## LOCATION

Region \_\_\_\_\_ Agency/Reservation \_\_\_\_\_  
Agency Code \_\_\_\_\_ Reservation Code \_\_\_\_\_  
Route No. \_\_\_\_\_ Section No. \_\_\_\_\_ Section Length \_\_\_\_\_ Surface Type \_\_\_\_\_  
HTF Constructed \_\_\_\_\_ (Yes, if constructed in 1983 or later)  
Surface Condition Rating \_\_\_\_\_

## Surface Maintenance Work Accomplished in FY \_\_\_\_\_

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---

---

---

Labor Cost \_\_\_\_\_  
Equipment Cost \_\_\_\_\_  
Material Cost \_\_\_\_\_  
Fuel Cost \_\_\_\_\_  
Other Costs (Mechanic, parts, etc.) \_\_\_\_\_  
Total Surface Cost \_\_\_\_\_

## Roadside Maintenance Work Accomplished in FY \_\_\_\_\_

---

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Labor Cost \_\_\_\_\_  
Equipment Cost \_\_\_\_\_  
Material Cost \_\_\_\_\_  
Fuel Cost \_\_\_\_\_  
Other Costs (Mechanic, parts, etc.) \_\_\_\_\_  
Total Surface Cost \_\_\_\_\_

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX F    FORMS**

Illustration 20:   FY 20\_\_ Roadside Unit Cost Calculation Form

FY \_\_ Roadside Unit Cost Calculation Form

Date \_\_\_\_\_  
Completed By \_\_\_\_\_  
Approved By \_\_\_\_\_

LOCATION

Region \_\_\_\_\_ Agency/Reservation \_\_\_\_\_  
Agency Code \_\_\_\_\_ Reservation Code \_\_\_\_\_  
Route No. \_\_\_\_\_ Section No. \_\_\_\_\_ Section Length \_\_\_\_\_

Roadside Activity

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Labor Cost \_\_\_\_\_  
Equipment Cost \_\_\_\_\_  
Material Cost \_\_\_\_\_  
Fuel Cost \_\_\_\_\_  
Other Costs (Mechanic, parts, etc.) \_\_\_\_\_  
Total Surface Cost \_\_\_\_\_

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX F   FORMS**

Illustration 21:   FY 20\_\_ Equipment Repair Form



# FY \_\_\_\_\_ Equipment Repair Form

Date \_\_\_\_\_ Completed By \_\_\_\_\_ Approved By \_\_\_\_\_

## LOCATION

Region \_\_\_\_\_ Agency/Reservation \_\_\_\_\_  
Agency Code \_\_\_\_\_ Reservation Code \_\_\_\_\_

## EQUIPMENT DATA

BIA Equipment No. \_\_\_\_\_  
Equipment Make/Model \_\_\_\_\_

Fiscal Year \_\_\_\_\_

<b>Minor Repair Work Needed</b>	<b>Minor Repair Work Accomplished</b>
<b>Labor Cost</b>	<b>Labor Cost</b>
<b>Equipment Cost</b>	<b>Equipment Cost</b>
<b>Material Cost</b>	<b>Material Cost</b>
<b>Other Costs</b>	<b>Other Costs</b>
<b>Total Urgent Maintenance Costs</b>	<b>Total Urgent Maintenance Costs</b>
<b>Major Repair Work Needed</b>	<b>Major Repair Work Accomplished</b>
<b>Labor Cost</b>	<b>Labor Cost</b>
<b>Equipment Cost</b>	<b>Equipment Cost</b>
<b>Material Cost</b>	<b>Material Cost</b>
<b>Other Costs</b>	<b>Other Costs</b>
<b>Total Urgent Maintenance Costs</b>	<b>Total Urgent Maintenance Costs</b>

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX F   FORMS**

Illustration 20:   FY 20\_\_ Roadside Unit Cost Calculation Form

FY \_\_ Roadside Unit Cost Calculation Form

Date \_\_\_\_\_  
Completed By \_\_\_\_\_  
Approved By \_\_\_\_\_

LOCATION

Region \_\_\_\_\_ Agency/Reservation \_\_\_\_\_  
Agency Code \_\_\_\_\_ Reservation Code \_\_\_\_\_  
Route No. \_\_\_\_\_ Section No. \_\_\_\_\_ Section Length \_\_\_\_\_

Roadside Activity

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Labor Cost \_\_\_\_\_  
Equipment Cost \_\_\_\_\_  
Material Cost \_\_\_\_\_  
Fuel Cost \_\_\_\_\_  
Other Costs (Mechanic, parts, etc.) \_\_\_\_\_  
Total Surface Cost \_\_\_\_\_

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX F   FORMS**

Illustration 22:   FY2003 Road Maintenance Accomplishment Form

# Road Maintenance Accomplishment Form

Date \_\_\_\_\_  
Completed By \_\_\_\_\_  
Approved By \_\_\_\_\_

## LOCATION

Region \_\_\_\_\_ Agency/Reservation \_\_\_\_\_  
Agency Code \_\_\_\_\_ Reservation Code \_\_\_\_\_  
Route No. \_\_\_\_\_ Section No. \_\_\_\_\_ Section Length \_\_\_\_\_  
HTF Constructed \_\_\_\_\_ (Yes, if constructed in 1983 or later)

If paved, what was the FY 200\_\_\_\_\_ Surface Condition Rating? \_\_\_\_\_

## ROAD DATA

Surface Type \_\_\_\_\_  
Surface Condition Rating \_\_\_\_\_

## Surface Maintenance Work Accomplished in FY \_\_\_\_\_

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Labor Cost \_\_\_\_\_  
Equipment Cost \_\_\_\_\_  
Material Cost \_\_\_\_\_  
Fuel Cost \_\_\_\_\_  
Other Costs (Mechanic, parts, etc.) \_\_\_\_\_  
Total Surface Cost \_\_\_\_\_

## Roadside Maintenance Work Accomplished in FY \_\_\_\_\_

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Labor Cost \_\_\_\_\_  
Equipment Cost \_\_\_\_\_  
Material Cost \_\_\_\_\_  
Fuel Cost \_\_\_\_\_  
Other Costs (Mechanic, parts, etc.) \_\_\_\_\_  
Total Surface Cost \_\_\_\_\_

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX F    FORMS**

Illustration 23:   FY20\_\_ Bridge Maintenance Accomplishment Form

# Bridge Maintenance Accomplishment Form

Date \_\_\_\_\_  
Completed By \_\_\_\_\_  
Approved By \_\_\_\_\_

## LOCATION

Region \_\_\_\_\_ Agency/Reservation \_\_\_\_\_  
Agency Code \_\_\_\_\_ Reservation Code \_\_\_\_\_  
Route No. \_\_\_\_\_ Section No. \_\_\_\_\_ Section Length \_\_\_\_\_  
HTF Constructed \_\_\_\_\_ (Yes, if constructed in 1983 or later)

If paved, what was the FY 200\_\_\_\_ Surface Condition Rating? \_\_\_\_\_

## ROAD DATA

Surface Type \_\_\_\_\_  
Surface Condition Rating \_\_\_\_\_

## Surface Maintenance Work Accomplished in FY \_\_\_\_\_

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Labor Cost \_\_\_\_\_  
Equipment Cost \_\_\_\_\_  
Material Cost \_\_\_\_\_  
Fuel Cost \_\_\_\_\_  
Other Costs (Mechanic, parts, etc.) \_\_\_\_\_  
Total Surface Cost \_\_\_\_\_

## Roadside Maintenance Work Accomplished in FY \_\_\_\_\_

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Labor Cost \_\_\_\_\_  
Equipment Cost \_\_\_\_\_  
Material Cost \_\_\_\_\_  
Fuel Cost \_\_\_\_\_  
Other Costs (Mechanic, parts, etc.) \_\_\_\_\_  
Total Surface Cost \_\_\_\_\_

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX F   FORMS**

Illustration 24: Road Maintenance Condition Assessment Survey  
Certification and Filing Instructions



## **Road Maintenance Condition Assessment Survey Certification and Filing Instructions**

Hard copies of all the data collected under the FY\_\_\_\_ Road Maintenance Condition Assessment Survey that is pertinent to an Agency are to be kept on file at that Agency. The data shall be certified by completing the Road Maintenance Condition Assessment Survey Certification which is to be attached to the data.

The data that is submitted by the Agencies to the Regions shall also be kept on file and certified in a similar manner.

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX F    FORMS**

Illustration 25: Road Maintenance Condition Assessment Survey  
Certification

## **Road Maintenance Condition Assessment Survey Certification**

**This document certifies that the FY\_\_\_\_\_ Road Maintenance Condition Assessment Survey(s) was/were conducted in accordance with the Bureau of Indian Affairs Maintenance Condition Assessment Survey Instructions and other guidelines contained therein.**

**Agency Engineer / Foreman** \_\_\_\_\_

**Date**\_\_\_\_\_

**Agency Superintendent** \_\_\_\_\_

**Date** \_\_\_\_\_

**Regional Road Maintenance Engineer** \_\_\_\_\_

**Date** \_\_\_\_\_

**Regional Roads Engineer** \_\_\_\_\_

**Date** \_\_\_\_\_

**Regional Director**\_\_\_\_\_

**Date**\_\_\_\_\_

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX G   EMERGENCY RELIEF**

Illustration 26   Memorandum of Agreement Regarding  
Emergency Relief

Illustration 27   Memorandum of Agreement Regarding  
Emergency Relief, Amendment 1

Illustration 28   23 CFR, Part 668, Subpart B – Procedures for Federal  
Agencies for Federal Roads

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX G   EMERGENCY RELIEF**

Illustration 26   Memorandum of Agreement Regarding  
Emergency Relief

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**MEMORANDUM OF AGREEMENT**  
**Emergency Relief**

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1.1 Introduction. The Memorandum of Agreement describes the relationship and establishes the procedures to be followed by the Bureau of Indian Affairs and the Federal Highway Administration in the programming and expenditure of emergency relief funds [commonly referred to as ERFO].

**MEMORANDUM OF AGREEMENT BETWEEN THE BUREAU OF INDIAN  
AFFAIRS AND THE FEDERAL HIGHWAY ADMINISTRATION FOR THE  
ADMINISTRATION OF EMERGENCY RELIEF AVAILABLE UNDER 23 U.S.C.  
125 FOR FEDERAL ROADS OFF THE FEDERAL-AID SYSTEM**

The purpose of this agreement is to establish interagency procedures through which the Federal Highway Administration (hereinafter referred to as the FHWA) and the Bureau of Indian Affairs (hereinafter referred to as the BIA) will administer emergency relief for Federal roads not on the Federal-aid system available under 23 U.S.C. 125, and

WHEREAS, the Secretary of Transportation (hereinafter referred to as the Secretary) acting through FHWA, is authorized to expend monies from an emergency fund authorized under 23 U.S.C. 125 for the repair or reconstruction of Indian reservation roads and bridges which the Secretary should find have suffered serious damages as the result of a natural disaster over a wide area or catastrophic failure from any cause (such finding actions being referred to, hereinafter, as Finding), and

WHEREAS, authority to make a Finding for Federal agencies for Indian reservation roads and bridges as defined in 23 U.S.C. 101 (a) has been delegated to the Regional Federal Highway Administrator in Regions 8 and 10 and the Regional Engineer in Region 15 (these Regional Administrators and Regional Engineer being referred to, hereinafter, as the RFHA), and

WHEREAS, the BIA may from time-to-time need emergency relief for Indian reservation roads and bridges not on the Federal-aid system (hereinafter being referred to as Federal roads),

NOW WITNESSETH that the BIA and FHWA do hereby mutually agree as follows:

1. **GENERAL**

- a. Indian reservation roads and bridges not on the Federal-aid system eligible for emergency relief under 23 U.S.C. 125 will be limited to Indian reservation roads and bridges that are on the Indian Road System (commonly called the BIA system), except;

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**MEMORANDUM OF AGREEMENT**  
**Emergency Relief**

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WHERE the President does not make a Major Disaster Declaration under the Disaster Relief Act of 1974 (P.L. 93-288) for any area(s) within an Indian reservation, FHWA will evaluate tribal roads and bridges within such area(s) damaged by natural disasters or catastrophic failures for eligibility for emergency relief under 23 U.S.C. 125 in accordance with the policies and procedures of FHPM 6-9-16-2, and

- (1) Inspection teams assessing damage to tribal roads and bridges will include a representative(s) of the individual tribe(s) which owns the damaged facility in addition to FHWA and BIA representatives.
  - (2) If damage is found to be eligible for emergency relief funding:
    - (a) the BIA will act on behalf of the individual Indian tribe(s) and will include the provisions for tribal roads and bridges with all requests and submittals under this agreement; (b) the BIA will administer repair and reconstruction of tribal roads and bridges in full accordance with the terms of this agreement as they apply to roads and bridges on the Indian Road System; and (c) funding for repair or reconstruction of tribal roads and bridges will be handled through obligational authority and liquidating cash transfers to the BIA in accordance with the transfer procedures of Section 6, herein, regardless of whether BIA or the individual tribe(s) performs and/or administers the work.
- b. The policies, procedures, and program guidance established in the Federal-Aid Highway Program Manual, Volume 6, Engineering and Traffic Operations; Chapter 9, Special Programs; Section 16, Emergency Relief Program; Subsection 2, Procedures for Federal Agencies for Federal Roads (hereinafter referred to as FHPM 6-9-16-2) will be followed in the administration of emergency relief between the FHWA and the BIA for Federal roads. By attachment as Appendix A, FHPM 6-9-16-2 is hereby made a part of this agreement.
- c. A Finding of eligibility for emergency relief requires that serious damage has occurred to Federal Roads as the result of (1) a natural disturbance causing serious damage to roads over a wide area, or (2) a catastrophic failure. It is understood that the term "wide area" can include areas outside Indian reservation boundaries and can include roads other than the Federal roads.

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**MEMORANDUM OF AGREEMENT**  
**Emergency Relief**

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- d. Emergency funds are available for reimbursement of costs directly attributable and allocable to preliminary engineering, construction engineering, and repair/reconstruction costs on individual emergency relief projects.
- e. Coordination between FHWA and the BIA will be as follows for emergency relief actions under the terms of this agreement:
  - (1) the BIA area offices located in Aberdeen, South Dakota; Albuquerque, New Mexico; Anadarko, Oklahoma; Muskogee, Oklahoma; Window Rock, Arizona; Phoenix, Arizona; Sacramento, California; and Billings, Montana; will coordinate with FHWA Region 8.
  - (2) The BIA area offices located in Portland, Oregon, and Juneau, Alaska, will coordinate with FHWA Region 10.
  - (3) The BIA area offices located in Minneapolis, Minnesota, and Washington, D.C., will coordinate with FHWA Region 15.
- f. The RFHA's and the BIA Area [sic] Director (hereinafter referred to as AD), will designate emergency relief coordinators (hereinafter referred to as ERFO Coordinators), in their respective regions and areas to be responsible on a continuing basis for the overall coordination of emergency relief.
- g. Projects may be funded by a combination of emergency relief monies covering work eligible for emergency relief and other funds covering work not eligible for emergency relief.
- h. The Director, Office of Federal Highway Projects in FHWA Regions 8 and 10 or the Regional Engineer for FHWA Region 15 will be the contracting officer for any project for which FHWA agrees to perform construction engineering regardless of whether the project is finished with emergency relief funds or emergency relief funds combined with other funds.
- i. All emergency relief work will be subject to the inspection and approval of the RFHA.



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**MEMORANDUM OF AGREEMENT**  
**Emergency Relief**

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**2. NOTIFICATION, DAMAGE ASSESSMENT, AND FINDING**

- a. Notification – When it appears that damage or destruction of a nature, and from an event, that will justify repair or reconstruction with emergency relief monies is occurring or has occurred to Federal roads, the BIA ERFO Coordinator will promptly notify the FHWA ERFO Coordinator by telephone that the BIA intends to apply for emergency relief and request that a Finding be made. The telephone notification will be followed by a written notification from the AD to the RFHA.
  - (1) The decisions to notify FHWA will be made by the AD. This decision will be made only after it is fairly clear that the conditions described in Section Ic have developed.
  - (2) In addition to a statement that the BIA intends to apply for emergency relief and a request that a Finding be made, the notification should describe (a) the Indian reservation(s) where damage has occurred; (b) occurrence date(s); (c) the general location and extent of affected Indian reservation area(s); (d) type(s) of damage; (e) a rough estimate of the cost of repair and reconstruction; (f) a general indication of the extraordinary character of the natural disturbance, and (g) if readily available, an indication of the extent of areas affected outside the Indian reservation(s).
  - (3) The notification will be made during or as soon as possible after the occurrence.
- b. Acknowledgement by FHWA – The RFHA will acknowledge each notification in writing. The acknowledgement will provide basic coordination, eligibility, damage assessment, and Finding information and procedures required by Paragraph 7b of FHPM 6-9-16-2.
- c. Field Coordination for Damage-Assessment
  - (1) The RFHA and AD will assign FHWA and BIA individuals to be responsible for field interagency coordination and field coordination between the BIA and FHWA, these individuals being referred to hereinafter as Field Coordinators.

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**MEMORANDUM OF AGREEMENT**  
**Emergency Relief**

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- (2) The AD and RFHA will assign BIA and FHWA personnel to cooperate with Field Coordinators in making a field survey of damage for preparation of a field report and in making detailed site inspections in accordance with the provisions of Section 2d and Section 2f, respectively.
- (3) BIA and FHWA Field Coordinators will arrange joint briefing meetings with BIA and FHWA inspection personnel prior to starting damage survey work.
- (4) Inspection teams consisting of BIA and FHWA personnel will be assigned jointly by the BIA and FHWA Field Coordinators at the briefing meetings. Inspection procedures and eligibility criteria will be explained to inspection personnel by the Field Coordinators at these meetings.
- (5) Two maps depicting designated Federal roads will be provided by the BIA to each inspection team at the time briefing meetings are held. Additional maps will be made available, as needed, for other agencies which may be involved in emergency relief operations.
- (6) During the period when damage surveys are in progress, Field Coordinators will manage their time so as to give top priority to the tasks of answering eligibility questions and ensuring consistency between survey teams, making advance arrangements for briefing sessions and subsequent damage inspections, collecting information for preparation of the field report, making changes in damage survey teams as necessary, and ensuring the general efficiency of emergency relief operations.

d. Field Report

- (1) FHWA and BIA personnel assigned per Sections 2c(1) and 2c(2) will promptly make a field survey of damage and cooperate in the preparation of a field report. The field report will contain information required by Paragraph 7c of FHPM 6-9-16-2 except that if the President has made a Major Disaster Declaration under the Disaster Relief Act of 1974 (P.L. 93-288), detailed

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**MEMORANDUM OF AGREEMENT**  
**Emergency Relief**

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information on the extraordinary nature of the natural disturbance is not required.

- (2) Unless unusual conditions prevail, it will be the intent of FHWA and the BIA to complete the field report within 3 weeks after the notification.

e. Finding

- (1) Using the field report and any other information he deems appropriate, the RFHA will issue a Finding to the AD stating that repair or reconstruction of Federal roads is (Affirmative Finding) or is not (Negative Finding) eligible for emergency relief.
- (2) If an Affirmative Finding is made, the RFHA will delineate the area(s) covered by such Finding. The RFHA may amend the initial Affirmative Finding to cover additional area(s) if supplementary data to that in the field report is provided to, and is acceptable to, the RFHA to support such action.

f. Detailed Damage Site Reports

- (1) If an Affirmative Finding is issued, FHWA and BIA personnel assigned as inspection team members pursuant to Section 2c(4) will make a detailed inspection of each damage site and cooperate in the preparation of a damage site report (DSR) to collect information required per Paragraph 7e(1) of FHPM 6-9-16-2.
- (2) The DSR will be prepared in a format approved by the RFHA and will provide for high quality photographs of damage to accompany DSR's to show extensive damage where complicated or very costly repairs are proposed, or to show damage of questionable eligibility.
- (3) Work eligibility and needs will be based on the criteria established in Paragraphs 6c, d, e, f, and g of FHPM 6-9-16-2, except that roads and trails which evolved over time without the benefit of engineered design will be eligible only for repair to preexisting conditions unless emergency repairs necessitate

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**MEMORANDUM OF AGREEMENT**  
**Emergency Relief**

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repair to higher standards. Any differences in opinion between FHWA and BIA inspection personnel concerning work needed and the eligibility of work for emergency relief funding will, to the extent possible, be resolved between the FHWA and BIA

- (4) Field Coordinators during the period when detailed site surveys are being conducted. Any eligibility questions which cannot be resolved by the Field Coordinators will be forwarded to the FHWA ERFO Coordinator for resolution.
- (5) If it appears certain an Affirmative Finding will be made, the RFHA may elect to conduct these inspections at the time damage is initially assessed pursuant to Section 2d.
- (6) Due to personnel shortages, the RFHA may elect to prescribe procedures whereby BIA personnel will conduct the detailed damage site inspections and complete the DSR's. As a minimum, such procedures should provide that:
  - (a) FHWA personnel will conduct reviews of selected sites and DSR's at a later date to determine the eligibility of damage, the eligibility of repair or reconstruction proposed, and whether the proposed method of construction is appropriate.
  - (b) Based on the results of FHWA reviews, the BIA will make appropriate changes in inspection procedures, in completed DSR's, in any list(s) of projects submitted per Section 3 as necessary, and will make any other changes deemed necessary by the RFHA.

**3. APPLICATION**

- a. Within 3 months after Affirmative Finding, the AD will submit an application for emergency relief to the RFHA in the form of a letter which will include a list of projects for which emergency relief is requested. It is desirable that the list of projects indicate whether the BIA will perform the work if the FHWA is requested to perform the work.

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**MEMORANDUM OF AGREEMENT**  
**Emergency Relief**

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- b. The list of projects will be based upon the detailed site inspections conducted per Section 2f, and will include the information required per Paragraph 8b of FHPM 6-9-16-2.
- c. The list of projects should separately identify proposed work which is eligible for emergency relief funding and work which is not eligible.
- d. If the initial list of projects is incomplete due to uncontrollable events, e.g., delays in completion of detailed site inspections due to weather, such will be noted in the application and a subsequent list(s) of projects will be forwarded as quickly as possible to the RFHA for approval consideration.

**4. PROGRAMMING**

- a. The RFHA will advise the AD by letter which projects in the application, and in any subsequent submittals per Section 3d, are approved including any approval condition. If applicable, the letter(s) will provide a statement of the work FHWA agrees to perform.
- b. Approved projects should constitute the approved program of projects (program).
- c. All requests for FHWA to perform work for emergency relief projects in addition to work requested of FHWA at the time of program approval will be made by letter from the AD to the RFHA. The RFHA will inform the AD in writing of additional FHWA agrees to perform.
- d. The RFHA will, as appropriate, make revisions to any programs approved based on DSR's later found to be in need of revision as the result of reviews per Section 2f(5)(a).
- e. Permanent work should have prior program approval in accordance with Section 4a unless such work is performed as emergency repairs. The definition of "permanent work" should be as defined in Paragraph 3h of FHPM 6-9-16-2.
- f. Emergency repairs, including permanent work performed incidental to emergency repairs, and all preliminary engineering may begin immediately and do not need prior program approval. Reimbursement, however, will be contingent upon the work ultimately being included in

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**MEMORANDUM OF AGREEMENT**  
**Emergency Relief**

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the approved program. The definition of “emergency repairs” should be as defined in Paragraph 3d of FHPM 6-9-16-2.

- g. Betterments may be programmed for emergency relief participation in accordance with Paragraph 6a of FHPM 6-9-16-2 if they are clearly justified pursuant to Paragraph 6f(3) of FHPM 6-9-16-2. The term “Betterments” should be as defined in Paragraph 3b of FHPM 6-9-16-2.

**5. PROJECT PROCEDURES**

- a. Plans, specifications, and estimates (PS & E) will be developed based on work identified in the approved program. If the BIA plans other work in addition to that identified in the approved program, the AD will notify the RFHA in writing of the additional work planned and will specify the source of funding and method of payment for such additional work.
- b. Standards to be used in reconstruction work should be consistent with standards in actual use for regular BIA work. The BIA will provide the FHWA with such standards for any work performed by FHWA.
- c. PS & E reviews and approvals, concurrence in award of contract of rejection of bids, determination that construction by the force account method is in the public interest, approval of directives, change orders, and supplemental agreements, acceptance of completed work and other administrative procedures will be in accordance with procedures established by the RFHA.
- d. The AD will notify the RFHA in writing of the semi-annual status, and completion of each emergency relief project constructed by the BIA.
- e. Where agreed to by the RFHA, simplified procedures, including abbreviated plans, will be used to expedite emergency relief work.
- f. Emergency relief projects should be promptly constructed. Normally, projects will be expected to be under construction by the end of the fiscal year following the year in which the disaster or catastrophic failure occurs. Projects not under construction by the end of the second fiscal year following the year in which the disaster or catastrophic failure occurred will be reevaluated by the RFHA and will be withdrawn from the approved program of projects unless suitable justification is provided by the BIA to warrant retention.

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**MEMORANDUM OF AGREEMENT**  
**Emergency Relief**

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**6. FUNDING PROCEDURES**

- a. Where the BIA is to perform the work, FHWA will transfer obligational authority and liquidating cash to the BIA not to exceed the amount of the work in the approved program. Obligational authority and liquidating cash will be transferred between the BIA and FHWA at the Headquarters level following arrangements made between the appropriate field offices of the FHWA and BIA.
- b. The BIA has the responsibility for administering funds transferred to it. This includes compliance with all applicable laws and regulations, and the reporting of fiscal data as may be required by FHWA.
- c. Upon completion of all work under a particular natural disaster or catastrophic failure, the BIA will submit through the RFHA a final accounting of all approved program items listing the program estimates as approved and final actual costs.
- d. During August of each year, the AD will submit to the RFHA an estimate of obligational authority and funding which will be needed by the BIA during the next fiscal year to accomplish work to be performed by the BIA to correct past disaster damage.

THIS AGREEMENT will be reviewed by the BIA and FHWA at least every 3 years to determine if changes should be sought.

RENEGOTIATION for any part of this agreement can be initiated at any time by either party.

THIS AGREEMENT shall become effective on the date of the last approving signature and will continue in effect until termination by either party upon giving a 60-day notice.

Approved:

FEDERAL HIGHWAY ADMINISTRATION

BUREAU OF INDIAN AFFAIRS

By: (sgd.) John Hassell, Jr.  
Deputy Federal Highway Administrator

By: (sgd.) Theodore Krenzke  
Acting Deputy Commissioner

Date: 2/25/79

Date: 2/15/79

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX G   EMERGENCY RELIEF**

Illustration 27   Memorandum of Agreement Regarding  
Emergency Relief, Amendment 1



**Amendment No. 1**  
**To**  
**Memorandum of Agreement**  
**Between**  
**The Bureau of Indian Affairs and**  
**The Federal Highway Administration**

Federal Highway Administration (FHWA) Order 1-1, Change 125, revised the delegation of authority for making emergency relief findings for Federal agencies. Therefore, the Memorandum of Agreement between the Bureau of Indian Affairs and the FHWA for the Administration of Emergency Relief Available under 23 U.S.C. 125 for Federal Roads Of the Federal-Aid system, is amended as follows:

1. On the first page, third paragraph, delete paragraph and replace with the following:  
Whereas, authority to make a finding for Federal agencies for Indian reservation roads and bridges as defined in 23 U.S.C. 101(a) has been delegated to the Direct Federal Division Engineers in the Eastern, Central and Western Direct Federal Divisions (the Direct Federal Division Engineers hereinafter referred to as the DFDE's) and...
2. On page 3, paragraph e(1), change "FHWA Region 8", to "Central Direct Federal Division." In paragraph e(3), change "FHWA Region 15" to "Eastern Direct Federal Division."
3. Page 3, paragraph h – Change first part of paragraph to "The FHWA Direct Federal Division Engineers will be the contracting officer..."
4. In the following paragraphs, insert "DFDE" for "RFHA";

Page 3, paragraph f  
Page 4, paragraphs I, 2a, 2b, 2c(1)  
Page 5, paragraph 2c(2)  
Page 6, paragraphs e(1), e(2) [3 places], f(2)  
Page 7, paragraphs f(4), f(5), f(5)(b), 3a, 3d  
Page 8, paragraphs 4(a), 4(c) [2 places], 4 (d)  
Page 9, paragraphs 5a, 5c, 5d, 5e, 5(f)  
Page 10, paragraphs 6c, 6d

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX G   EMERGENCY RELIEF**

Illustration 28   23 CFR, Part 668, Subpart B – Procedures for  
Federal Agencies for Federal Roads

## 23 CFR, PART 668, SUBPART B – PROCEDURES FOR FEDERAL AGENCIES FOR FEDERAL ROADS

### § 668.201 Purpose.

To establish policy, procedures, and program guidance for the administration of emergency relief to Federal agencies for the repair or reconstruction of Federal roads which are found to have suffered serious damage by a natural disaster over a wide area or by catastrophic failure.

[43 FR 59485, Dec. 21, 1978]

### § 668.203 Definitions.

- (a) *Applicant*. Any Federal agency which submits an application for emergency relief and which has authority to repair or reconstruct Federal roads.
- (b) *Betterments*. Added protective features, such as, the relocation or rebuilding of roadways at a higher elevation or the extension, replacement or raising of bridges, and added facilities not existing prior to the natural disaster or catastrophic failure such as additional lanes, upgraded surfacing, or structures.
- (c) *Catastrophic Failure*. The sudden failure of a major element or segment of a Federal road which is not primarily attributable to gradual and progressive deterioration or lack of proper maintenance. The closure of a facility because of imminent danger of collapse is not in itself a sudden failure.
- (d) *Emergency Repairs*. Those repairs, including necessary preliminary engineering (PE), construction engineering (CE), and temporary traffic operations, undertaken during or immediately after a natural disaster or catastrophic failure (1) to restore essential travel, (2) to protect remaining facilities, or (3) to minimize the extent of damage.
- (e) *Federal Roads*. Forest highways, forest development roads and trails, park roads and trails, parkways, public lands highways, public lands development roads and trails, and Indian reservation roads as defined under 23 U.S.C. 101(a).
- (f) *Finding*. A letter or other official correspondence issued by the Direct Federal Division Engineer (DFDE) to a Federal agency giving notification that pursuant to 23 U.S.C. 125, Federal roads have (Affirmative Finding) or have not (Negative Finding) been found to have suffered serious damage as the result of (1) natural disaster over a wide area, or (2) a catastrophic failure.
- (g) *Natural Disaster*. An unusual natural occurrence such as a flood, hurricane, severe storm, tidal wave, earthquake, or landslide, which causes serious damage.
- (h) *Permanent Work*. Repair or reconstruction to pre-disaster or other allowed geometric and construction standards and related PE and CE.
- (i) *Direct Federal Division Engineer*. Director of one of the Direct Federal field offices located in Vancouver, WA; Denver, CO; and Arlington, VA.

[43 FR 59485, Dec. 21, 1978, as amended at 47 FR 10529, Mar. 11, 1982.]

### **§ 668.205 Policy.**

- (a) This emergency relief program is intended to pay the unusually heavy expensed in the repair and reconstruction of Federal roads resulting from damage caused by natural disasters over a wide area or catastrophic failures.
- (b) Emergency relief work should be given prompt attention and priority over non-emergency work.
- (c) Permanent work should be done by contract awarded by competitive bidding through formal advertising, where feasible.
- (d) It is in the public interest to perform emergency repairs immediately and prior approval or authorization from the DFDE is not required. Emergency repairs may be performed by the method of contracting (advertised contract, negotiated contract, or force account) which the applicant or the Federal Highway administration (FHWA) (where FHWA performs the work) determines to be most suited for this work.
- (e) Emergency relief projects should be promptly constructed. Projects not under construction by the end of the second fiscal year following the year in which the disaster occurred will be re-evaluated by the DFDE and will be withdrawn from the approved program of projects unless suitable justification is provided by the applicant to warrant retention.
- (f) The Finding for natural disasters will be based on both the extraordinary character of the natural disturbance and the wide area of impact. Storms of unusual intensity occurring over a small area do not meet these conditions.
- (g) Diligent efforts should be made to recover repair costs from the legally responsible parties to reduce the project costs where highway damages are caused by ships, barge tows, highway vehicles, vehicles with illegal loads, and similar improperly controlled objects or events.
- (h) Emergency funds should not duplicate assistance under another Federal program or compensation from insurance or any other source. Where other funding compensates for only part of an eligible cost, emergency relief funding can be used to pay the remaining costs.

[43 FR 59485, Dec. 21, 1978, as amended at 47 FR 10529, Mar. 11, 1982.]

### **§ 668.207 Federal Share payable from emergency fund.**

The Federal share payable under this program is 100 percent of the cost.

[43 FR 59485, Dec. 21, 1978]

### **§ 668.209 Eligibility of work.**

- (a) Permanent work should have prior program approval in accordance with paragraph (a) of §668.215 unless such work is performed as emergency repairs.
- (b) Emergency repairs, including permanent work performed incidental to emergency repairs, and all PE may begin immediately and do not need prior program approval. Reimbursement should be contingent upon the work ultimately being approved in accordance with the requirements of paragraph (a) §668.215.

- (c) To qualify for emergency relief, the damaged or destroyed road or trail should be designated as a Federal Road.
- (d) Replacement highway facilities are appropriate when it is not practical and economically feasible to repair or restore a damaged element to its pre-existing condition. Emergency relief is limited to the cost of a new facility constructed to current design standards of comparable capacity and character to the destroyed facility. With respect to a bridge, a comparable facility is one which meets current geometric and construction standards for the type and volume of traffic it will carry during its design life.
- (e) Emergency relief funds may participate to the extent of eligible repair costs when proposed projects contain betterments or other work not eligible for emergency funds.
- (f) Work may include:
  - (1) Repair to, or reconstruction of, seriously damaged highway elements for a distance which would be within normal highway right-of-way limits, including necessary clearance of debris and other deposits in drainage courses, where such work would not be classed as heavy maintenance.
  - (2) Restoration of stream channels when the work is necessary for the satisfactory operation of the Federal road. The applicant should have responsibility and authority for maintenance and proper operation of stream channels restored.
  - (3) Betterments where clearly economically justified to prevent future recurring damage. Economic justification acceptable to the DFDE should weigh the cost of such betterments against the risk of eligible recurring damage and the cost of future repair.
  - (4) Actual PE and CE costs on approved projects.
  - (5) Emergency Repairs.

[43 FR 59485, Dec. 21, 1978, as amended at 47 FR 10529, Mar. 11, 1982.]

#### **§ 668.211 Notification, damage assessment, and finding.**

- (a) *Notification.* During or as soon as possible after a natural disaster or catastrophic failure, each applicant will notify the DFDE of its tentative intent to apply for emergency relief and request that a Finding be made.
- (b) *Acknowledgement.* The DFDE will promptly acknowledge the notification and briefly describe subsequent damage assessment, Finding, and application procedures.
- (c) *Field Report.* The applicant should cooperate with the DFDE to promptly make a field survey of overall damage and in the preparation of a field report.
- (d) *Finding.* Using the field report and other information deemed appropriate, the DFDE will promptly issue a Finding and if an Affirmative Finding is made, establish the date after which repair or reconstruction will be considered for emergency relief, and note the dates of the extraordinary natural occurrence or catastrophic event responsible for the damage or destruction.
- (e) *Detailed Site Inspections.*

- (1) If an Affirmative Finding is made, the applicant should cooperate with the DFDE to make a detailed inspection of each damage site.
  - (2) If it appears certain an Affirmative Finding will be made, the DFDE may elect to make these site inspections at the time damage is initially assessed pursuant to paragraph (c) of this section.
- (f) The applicant should make available to FHWA personnel conducting damage survey and estimate work maps depicting designated Federal roads in the affected area.

[43 FR 59485, Dec. 21, 1978, as amended at 47 FR 10529, Mar. 11, 1982.]

### **§ 668.213 Application Procedures**

- (a) Based on the detailed site inspections and damage estimates prepared pursuant to paragraph (e) of § 668.211, the applicant will submit an application in the form of a letter to the DFDE which should include a list of projects for which emergency relief is requested. The application should be submitted within 3 months after an Affirmative Finding.
- (b) The list of projects should include emergency repairs, PE, and permanent work, and provide for each project a location, length, project number, type of damage, description of work with a separate breakdown for betterments including a justification for those intended for emergency relief funding, proposed method of construction, estimated cost, and any other information requested by the DFDE.
- (c) If the initial list of projects is incomplete, a subsequent list(s) of projects should be forwarded to the DFDE for approval consideration as soon as possible.

[43 FR 59485, Dec. 21, 1978, as amended at 47 FR 10529, Mar. 11, 1982.]

### **§ 668.215 Programming and project procedures.**

- (a) The DFDE will advise the applicant in writing which projects in the application, or in any subsequent submittals pursuant to paragraph (c) of § 668.213 are approved including any approval conditions. Approved projects should constitute the approved program of projects (program).
- (b) Plans, specifications, and estimates (PS & E) should be developed based on work identified in the approved program.
- (c) The DFDE will approve PS & E's, concur in the award of contracts or the rejection of bids, determine that construction by the force account method is in the public interest, and accept completed work in accordance with interagency procedures established by the DFDE.
- (d) The applicant should notify the DFDE in writing of the semi-annual status and completion of each emergency relief project constructed by applicant forces.

[43 FR 59485, Dec. 21, 1978, as amended at 47 FR 10529, Mar. 11, 1982.]

# **BIA Handbook for Transportation Facilities Maintenance**

## **APPENDIX H   GRADING & SHAPING GUIDELINES**

Illustration 29:   Grading & Shaping of Dirt Surfaces

## **GRADING & SHAPING OF DIRT SURFACES**

The majority of roads under the maintenance jurisdiction of the BIA are native surface (i.e., dirt) roads. These roads serve the local communities and general public. Dirt roads are not all-weather roads, however they are heavily used every day to provide access to schools, hospitals, commercial centers, and recreational areas. It is extremely important that these roads remain passable. Smoothness and rider comfort are secondary goals.

Grading the road with a motorgrader is the primary type of maintenance for dirt roads.

Since grading is so important, problems resulting from improper motorgrader operations will be examined and proper operating techniques will be recommended.

In dry weather, traffic compacts the surface of dirt roads which often results in a hard surface crust. Dry grading a road when it has this hard surface crust is not effective.

If the operator is not careful, he will break through the crust and destroy the riding surface and open the road up to further deterioration.

If the operator smoothes the road without breaking the crust, any work he does will be ruined almost immediately by the wind or traffic. The work is only cosmetic; it may satisfy the public but is not productive beyond providing good public relations.

It is recommended that dry grading not be performed. If grading must be performed in dry weather, it is recommended that the road surface be reconditioned by scarifying the surface, and the road material be worked, relaid, watered, and compacted. This will provide a smooth and longer lasting surface. However, it is best to wait until the surface is moist, when the road surface can be graded and shaped at a minimum cost.

In wet conditions due to rain, the road can become a swamp, with mud and standing water on the road. In wet and muddy conditions, little can be done to make the road passable. Except in an emergency situation, it is best to wait until the road dries out before attempting any grading of the surface.

In an emergency situation, the road could be graded but it would generally require the operator to use tire chains and grade all the mud off the road. While this allows an ambulance to use the road, it also creates a channel for the water to run in and ruins the existing drainage. As soon as possible the road should be entirely reshaped to a crown of  $\frac{1}{2}$ " to 1" per foot of road width, measured from the center of the road. Shoulders and ditches should also be reshaped to drain. Ditches should not be disturbed if they are functioning.

In wet conditions due to snow, roads can be impassable during the warm daylight hours and passable during the freezing night and early morning hours. Such roads could be smoothed in the early morning to allow passage of school buses and commuter traffic. The operator should be mindful that the returning traffic in the afternoon or early evening will undo that work. Care must be taken during this type operation to avoid damaging the road's existing drainage. The road should then be reshaped as soon as possible to a crown of  $\frac{1}{2}$ " to 1" per foot of road width,



measured from the center of the road. Shoulders and ditches should also be reshaped to drain. Ditches should not be disturbed if they are functioning.

Maintenance of a dirt road in hard freeze weather conditions consists of plowing snow to keep the road open. Snow should be removed from dirt roads as soon as possible to allow the road to dry out. As snow that is left on dirt roads melts, it saturates and weakens the subgrade and creates a wet muddy surface.

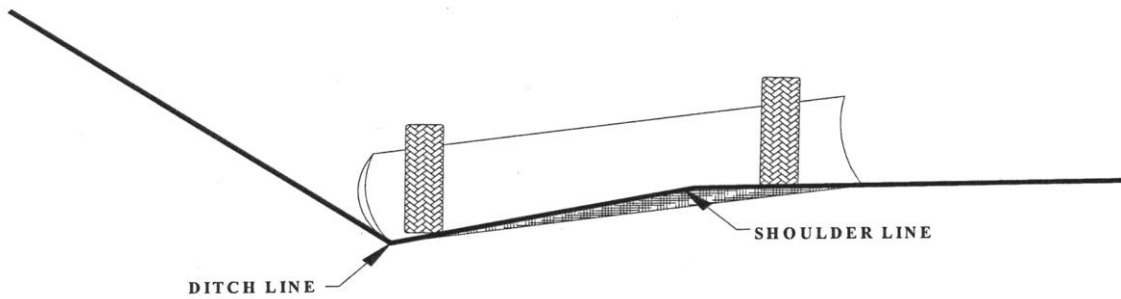
Avoid piling windrows of plowed snow in such a way as to block intersections with access roads and private driveways.

Additionally, careless grading can result in poor drainage. Dirt roads must support traffic loads directly on the subgrade. The road may be able to support these traffic loads as long as grading operations provide proper drainage.

It is extremely important to shape the road, shoulders, and ditch line to drain. Water must be drained off the road before it can saturate the surface. A crown of  $\frac{1}{2}$ " to 1" per foot of road width, measured from the centerline, should be adequate to drain the road. Insufficient crown and low points in the road surface allow water to pond and saturate it.

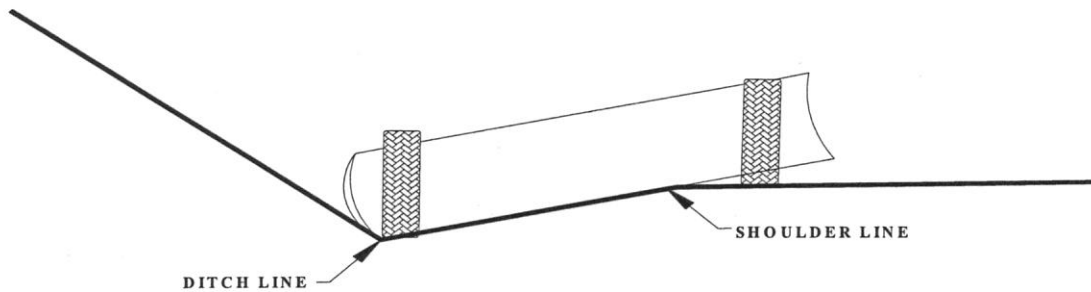
Leaving loose material on the surface can also cause water to pond. When grading along the outside edge of the road the operator should be sure the blade extends over the edge. This will allow loose material to be removed from the road, thereby avoiding a windrow which would disrupt surface cross drainage.

Improper operation while maintaining a ditch line can result in reducing the shoulder width. See illustration below:



**WRONG**

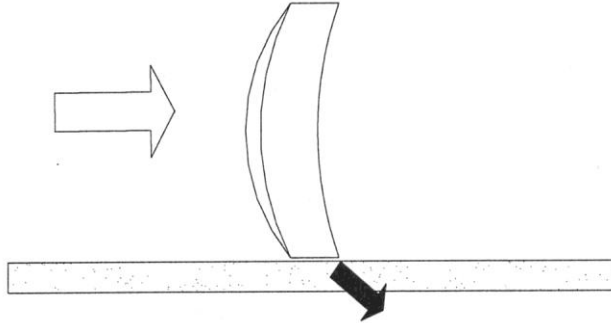
To avoid this, place the blade along the slope from the shoulder line to the ditch line while keeping an eye on the shoulder line. Raise the heel of the blade whenever there is a dip in the ditch line or shoulder dip or an increase in the slope. See illustration below:



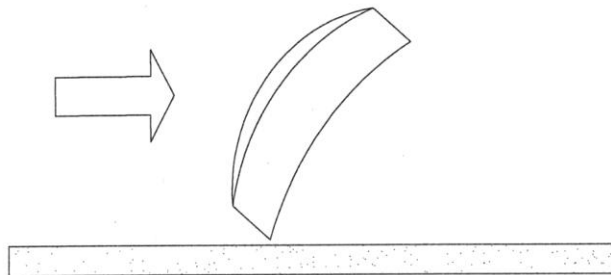
**RIGHT**

Since it is important that the operator not break the crust, it is strongly recommended that dry grading only be performed when the road can be reconditioned. When dry grading is absolutely necessary, the operator should follow the example shown below in order to avoid breaking the crust. In the example, the blade is tilted forward and rides over the surface to smooth it.

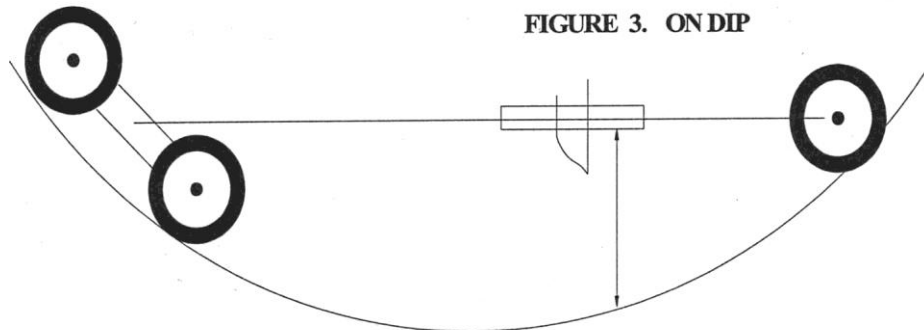
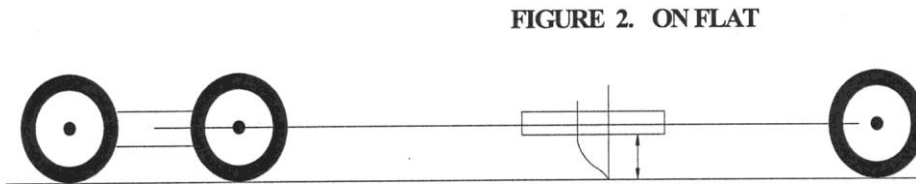
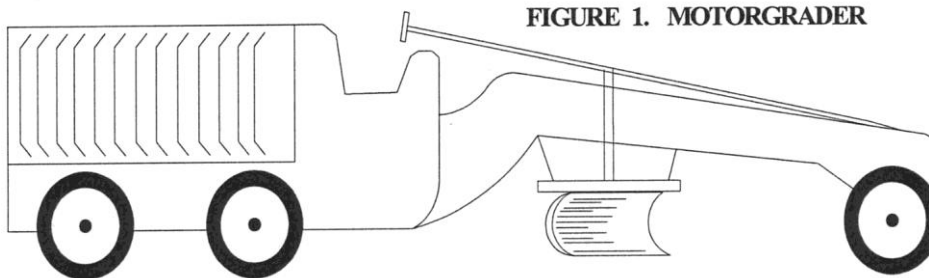
## 1. BLADE DIGS IN



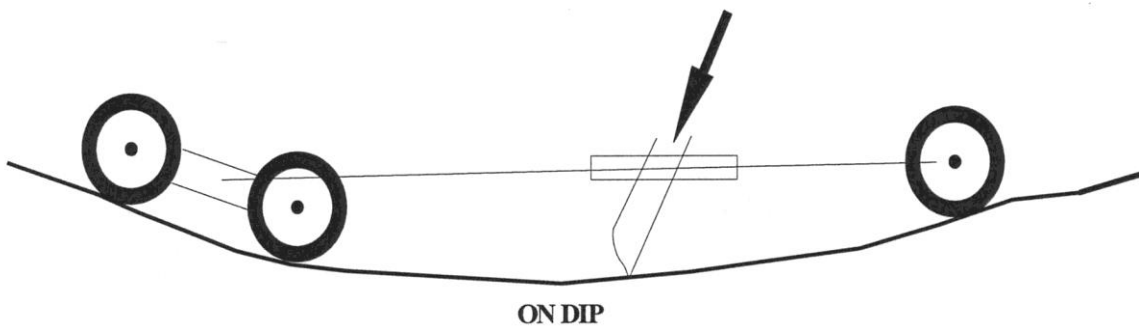
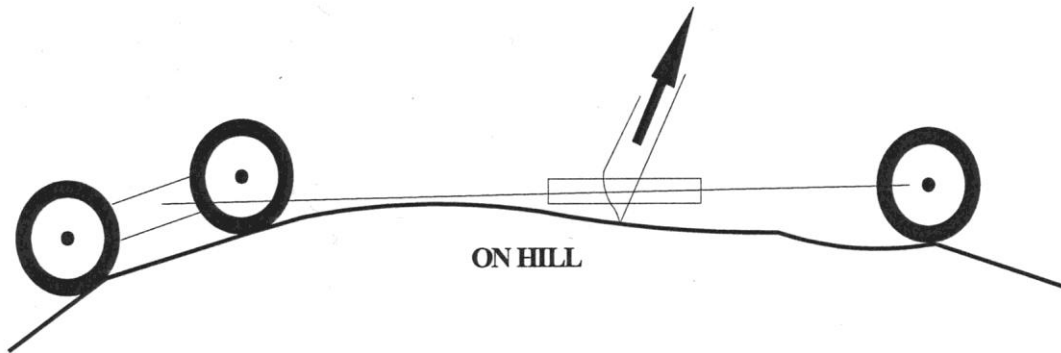
## 2. BLADE RIDES ON SURFACE



Like any other type of road; a dirt road must have a cross slope or crown in order to drain away water. The blade on a grader is set for a cross slope, but because a grader is a rigid line between the front and rear wheels, it must be adjusted as necessary to meet any changes in the horizontal and vertical alignment of the road. The blade is attached to this rigid line and must be adjusted to accommodate changes in the road. While a grader may resemble the one shown in Figure 1, it can also be represented as seen in Figures 2 and 3. Figure 2 shows the blade as it appears on a level surface. Figure 3 shows the blade as it appears when there is a dip or low spot in the road. Note how the distance between the blade and ground has increased. The operator is cautioned to remember that the blade must be moved up or down to correct for a change in grade.

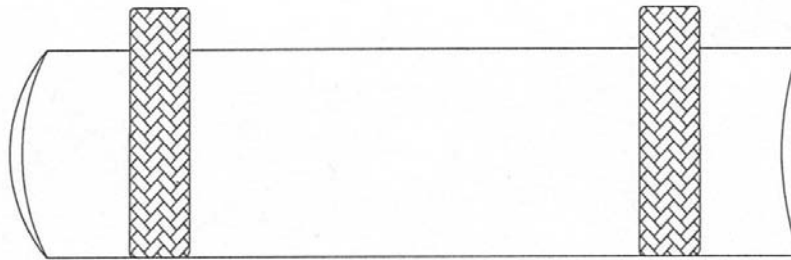


Additionally, on a rise or hill, the blade must be raised to avoid cutting too deeply. The operator should be careful to avoid causing low spots in the road. These will result in drainage problems.

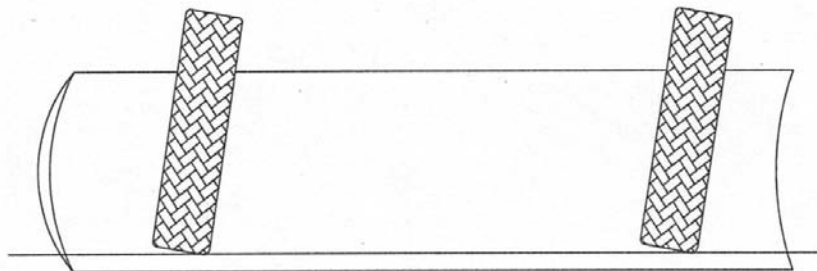


In dips, the blade must be lowered to keep contact with the surface.

To reduce turning effort and make the curve shorter, the front wheels should be leaned into the curve. Leaning the front wheels however, will also lower the frame. The operator should watch the blade to be sure it does not break the crust.

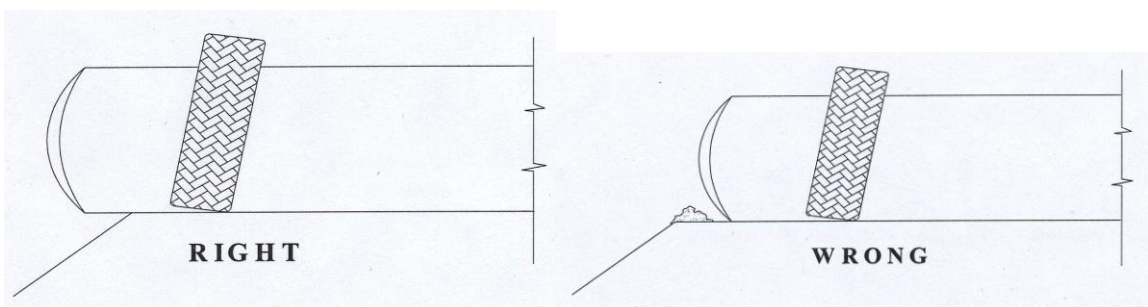


**ON STRAIGHT**



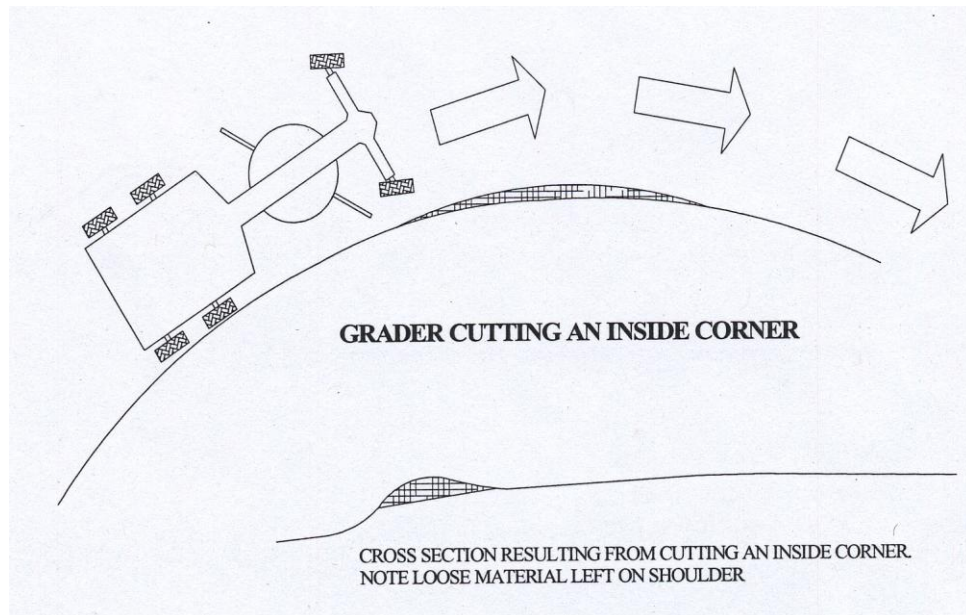
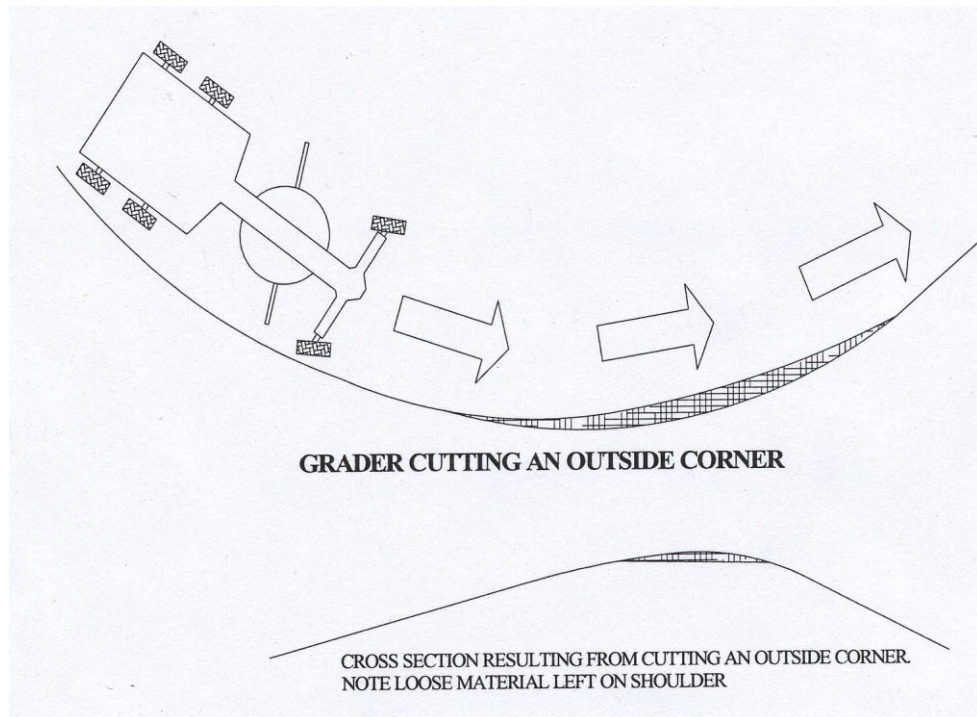
**ON CURVE  
BLADE CUTTING INTO SURFACE**

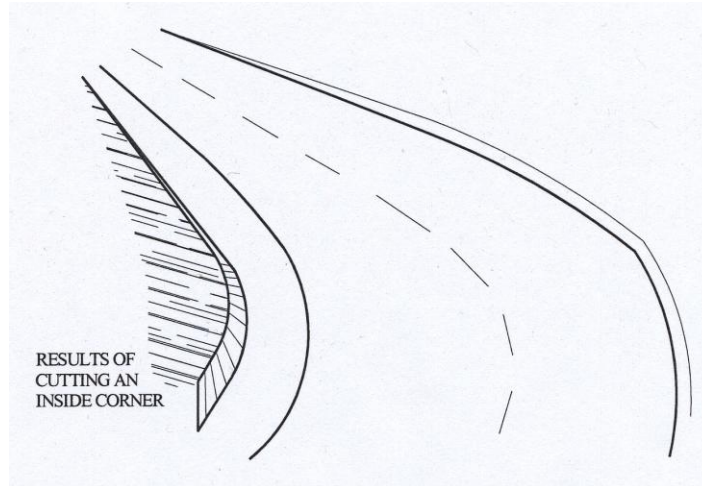
As snow melts when it is left on the road, it saturates and weakens the subgrade and creates a wet muddy surface. The operator should avoid blocking intersections with access roads and private driveways with windrows of plowed snow. Additionally, sloppy grading can result in poor drainage. Dirt roads must support traffic loads directly on the subgrade. The road may be able to support these traffic loads as long as grading operations provide proper drainage.



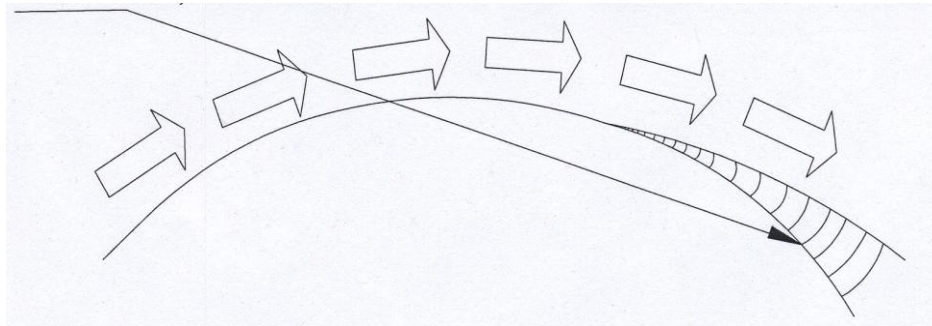
Another common road maintenance motorgrader error occurs when the operator cuts the corner while going around a curve. This results in a high spot on the outside of the curve and a mound of soft material which can cause ditch blockage or surface ponding.

Cutting the corner on the inside of a curve may result in a wheel dropping off and the inside shoulder being cut away.

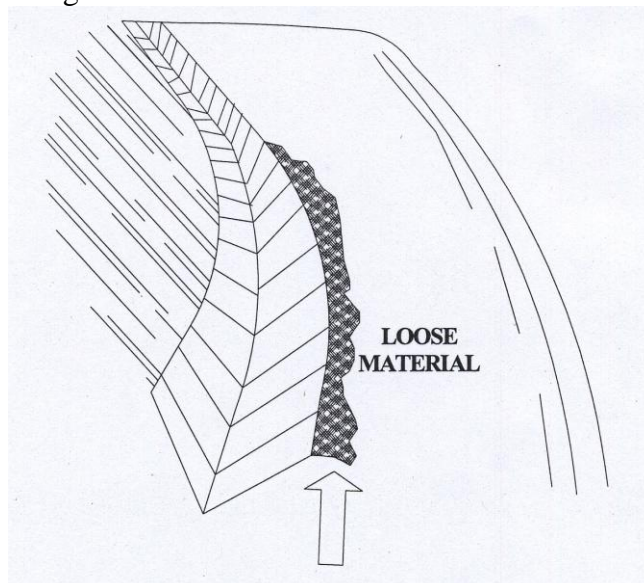




On sharp curves to the inside, if the shoulder is not cut, the motorgrader may flair out, leaving an untouched area, as shown below.

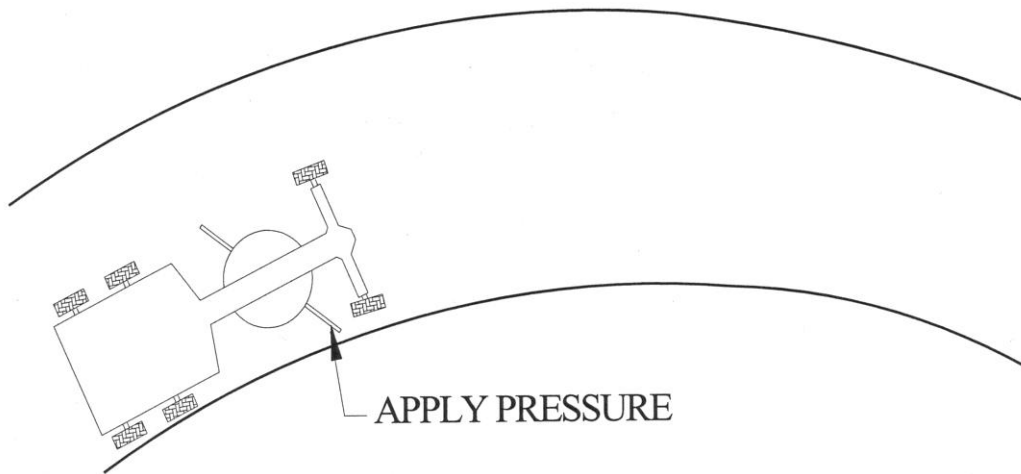


This area will be higher than the surface and will channel the water on the road, as shown below:

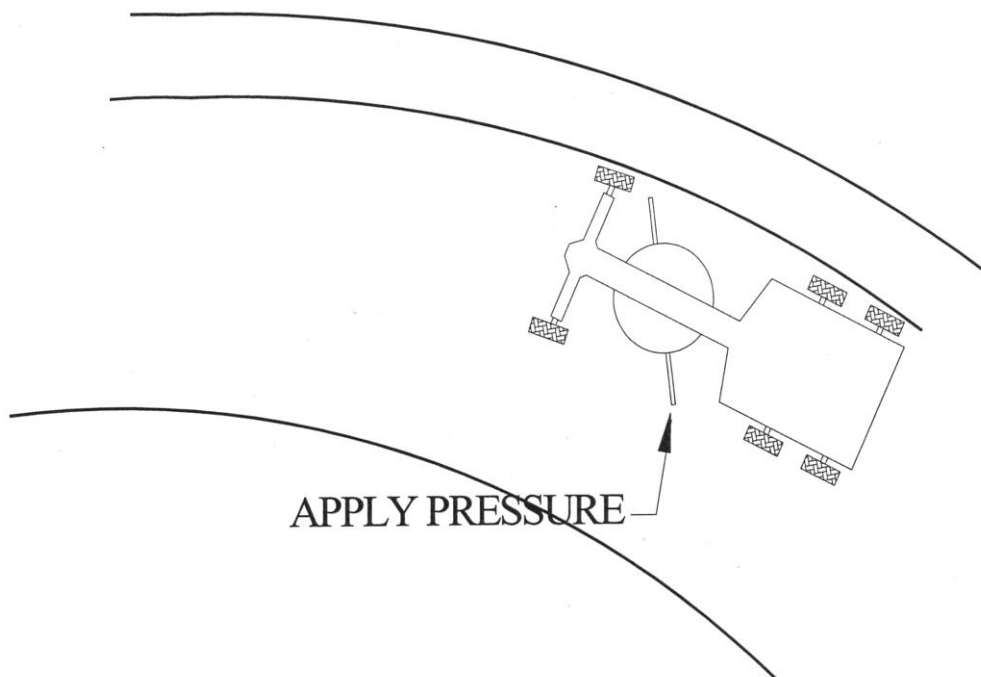




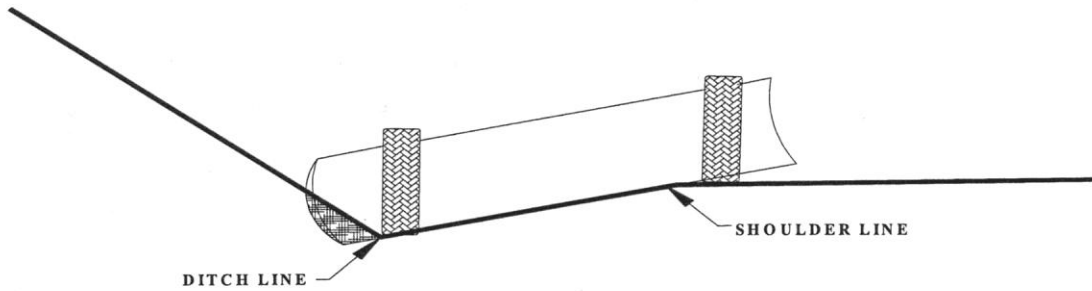
To correct the habit of cutting the corner as the grader enters the curve, the operator should apply pressure to the toe of the blade (if on the inside of the curve)



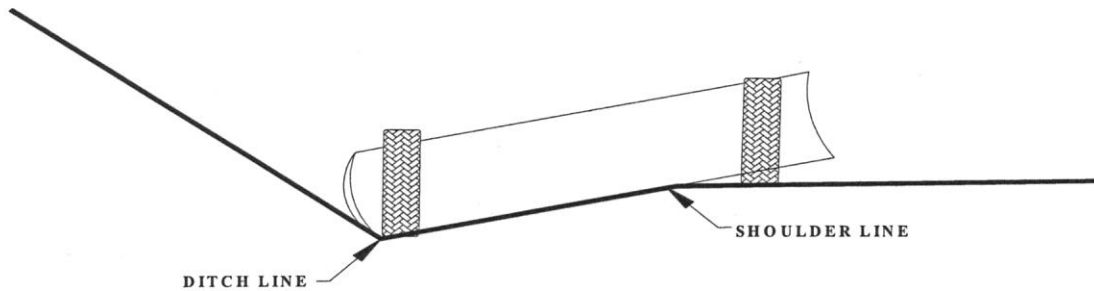
To correct the habit of cutting the corner as the grader enters the curve, the operator should apply pressure to the heel of the blade (if on the outside of the curve)



To clean a ditch, operator should tilt the blade back and run with the toe on the ditch line. Riding with the wheel in the ditch should keep the blade on the ditch line. If this technique is not followed, undercutting of the bank slope will occur. Undercutting is to be avoided. Although the finished backslope looks neat and clean immediately after undercutting, the soil will dry out quickly and slough back into the ditch.

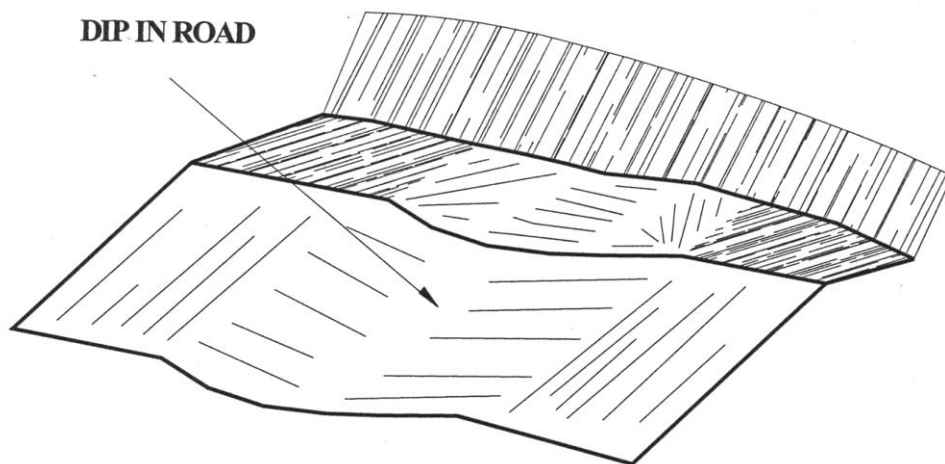
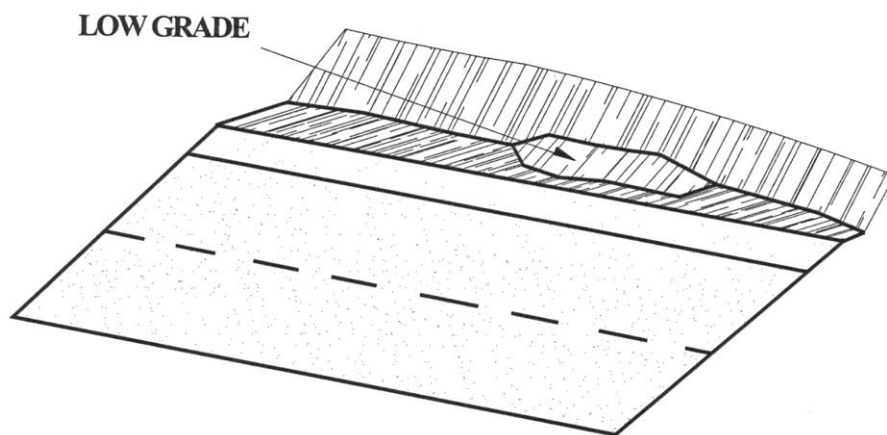
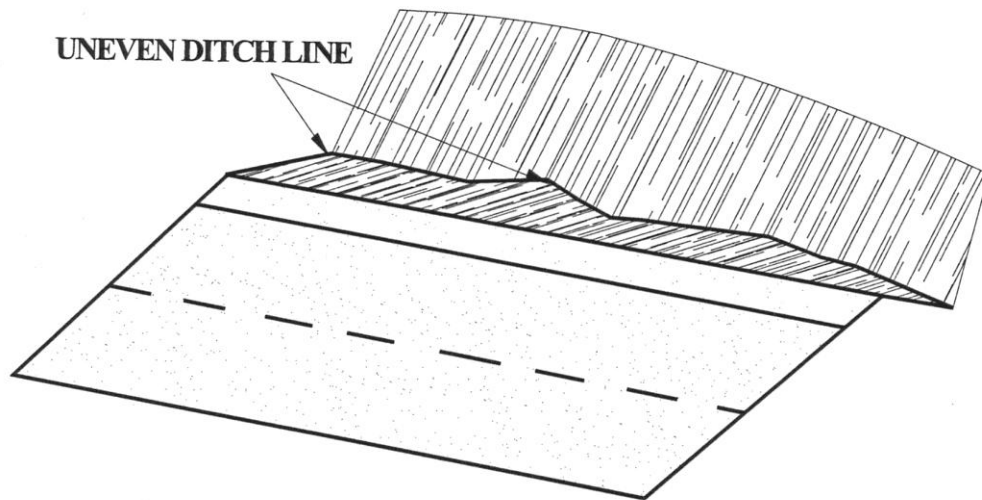


**WRONG**



**RIGHT**

Problems can occur when there are low spots in the ditch line and dips in the road.



Check the road surface before beginning work and note low spots (i.e. where there is the appearance of ponds or wetness) and lift the blade slightly at low spots and dig a little deeper at high spots. This technique will level the ditch out. When a dip exists, gradually raise the blade as you approach it, and then lower the blade to create a new ditch line which is the reverse of the road dip. This technique allows water to flow by the sag without ponding.

Finally, a common grading error occurs when the operator grades too fast. Too much speed will cause the grader to bounce and it will dig into the road or ditch. Too much speed can cause the operator to lose control of the grader which could result in an accident. A good speed for road maintenance grader operations is walking speed or slower.