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# MAP

## Maintenance Achievement Program

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### Manual

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Maintenance and Asset Management Division  
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## Section 1 - Overview

### ***Highway Maintenance***

State highways are the lifeline for Nevada commutes, travel and commerce. They combine to form one of the state's largest public infrastructure investments. From snow removal and accident traffic control to repaving and repainting, NDOT maintenance forces perform a large variety of road maintenance-related tasks to help ensure safety and mobility for the traveling public. Through these tasks NDOT protects and upkeeps state roads with expertise, dedication and a recognition of the invaluable public investment of each roadway. The state highway system consists of:

- Approximately 13,000 lane miles
- Approximately 1,090 bridges
- 37 rest areas
- Numerous infrastructure assets within NDOT right of way

The goal of the NDOT Maintenance Program is to preserve the condition of the Nevada state highway system and ensure safe travel for the public. The statewide Maintenance Program accounts for approximately 18% of the total NDOT budget.

### ***Program Purpose***

The Maintenance Achievement Program (MAP) is an initiative that aims to objectively measure the Level of Service (LOS) provided by NDOT highway maintenance tasks. LOS data is collected statewide and compared to established targets for each maintenance task, allowing NDOT to more effectively plan, budget and manage highway maintenance work.

The purpose of MAP is to provide for the continual improvement of NDOT maintenance performance and improve overall program effectiveness and efficiency.

### ***Program Process***

Field surveys are performed at statistically valid, randomly chosen segments across the Nevada state highway system. Maintenance task outcome measures are used to determine the LOS values (A through F) of each applicable maintenance task within the randomly chosen survey segments. Data from each survey segment is compiled to form a representative sample of the Nevada state highway system.

The following chapters provide LOS and survey information in addition to maintenance task description information and corresponding outcome measure information.

## **Section 2 - Level of Service**

MAP utilizes a letter grade rating scale to report the Level of Service (LOS) for maintenance tasks. The specific outcome measures, outcome units, and LOS thresholds for each maintenance task are detailed in the Maintenance Task Outcome Criteria section. The following is a generalized summary of the LOS ratings:

### **Level of Service A (Best)**

“A” is the highest level of service in which the roadway and associated features are in excellent condition. All systems are operational and users experience no delays. Very few deficiencies are present and the overall appearance is pleasing. Preventive maintenance is practiced resulting in overall low life-cycle costs and pleasant appearance.

### **Level of Service B**

“B” is an above average level of service in which the roadway and associated features are in good condition. All systems are operational. Very few deficiencies are present in safety and protection related tasks but moderate deficiencies exist in other tasks. Preventive maintenance is practiced for safety-related work, but may be 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.

### **Level of Service C**

“C” is a medium level of service 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 become necessary. Few deficiencies are present in safety related tasks, however, moderate deficiencies exist for investment protection tasks and significant aesthetic related deficiencies are present in remaining tasks. A backlog of deficiencies begins to build up that will result in greater future maintenance cost. Some roadway structural problems begin to appear due to the long-term deterioration of the system.

### **Level of Service D**

“D” is a below average level of service in which the roadway and associated features remain in generally poor condition. Systems failures occur regularly due to the inability of maintenance forces to react in a timely manner. Delays may be significant. Moderate deficiencies are present in safety related tasks and significant deficiencies exist for all other tasks. Maintenance has become reactionary as opposed to preventative and significant roadway structural deficiencies exist that accelerate the long-term deterioration of the system.

### **Level of Service F (Worst)**

“F” represents the lowest level of service in which the roadway and associated features remain in poor and failing condition. Significant delays occur on a regular basis. Significant deficiencies are present in all maintenance tasks. The overall appearance is not aesthetically pleasing. Preventive maintenance is practiced for few, if any, maintenance tasks. Excessive safety problems occur. Overall maintenance operations are at their highest life-cycle costs.

## Section 3 - Field Surveys

### ***Safety and Data Collection Equipment***

The field survey crews should have the following equipment available for safe and effective data collection:

- Notebook, or note pad and clipboard, and pens/pencils for recording data and any pertinent notes about data collection.
- NDOT MAP Data Collection Manual.
- Sufficient supply of Field Survey Rating Forms for the anticipated data collection period.
- Handheld GPS device for obtaining coordinates of sample locations.
- Digital camera for taking photographs of asset conditions.
- Handheld PDA device or laptop computer for recording data and notes and viewing area routes and sample locations.
- Cell phone for calling emergency services.
- Flexible metal measuring tape, ¾-inch wide by 25 feet long.
- 100-foot cloth or metal measuring tape.
- Measuring wheel for measuring distances longer than the length of the flexible tape.
- 5-Foot straightedge or carpenter's level for determining shoulder drop-off.
- Flashlight, for examining the interior of drains, and catch basins.
- Tool bag for stowing and carrying gear.
- Vehicle equipped with:
  - Flashing yellow/orange safety lights on top of vehicle.
  - A minimum of two reflective orange traffic cones.
  - Two "Survey Crew Ahead" signs.
  - 12-volt socket "splitter" to allow more than one device to be plugged into the cigarette lighter.
- Several cans of marking paint to mark sample locations.
- Protective clothing, such as field boots, jeans, hat, safety glasses, and other outdoor wear appropriate for the season.
- Reflective safety vests that meet NDOT requirements.
- Advance notice to NDOT Sub-District Offices of planned surveys in their areas. See Appendix B for contact names, telephone numbers, and email addresses.

## ***Field Survey Procedures***

Personnel performing the field surveys and/or personnel exposed to highway traffic must utilize safety apparel of high-visibility fluorescent yellow-green, orange or a combination of these colors conforming to ANSI/ISEA 107-2004 “American National Standard for High-Visibility Safety Apparel.”

Prior to performing the survey, signs labeled “SURVEY CREW AHEAD” shall be placed in both directions of travel outside of the survey boundaries. The length of the survey segment is 0.1 miles.

### **Survey Procedures:**

- Locate the route and mile point of the sample site using mile-marker sign posts when available. Otherwise, the locations may be found by using handheld GPS devices to locate the site using latitude and longitude coordinates.
- Evaluate the suitability and safety of the site. For example, if the sample location falls in a construction zone, or encompasses a busy intersection, move the sample ahead to back as necessary to avoid the problem.
- Park the survey vehicle off the shoulder of the road at the beginning of the site and place traffic cones and signs according to Department policy. Activate all flashing lights on the vehicle and wear approved safety vests.
- Mark the boundaries of the site by spray-painting a stripe at, and perpendicular to, the edge of pavement approximately 18 inches long and 1 inch wide. Spray-paint an arrow approximately 6 inches long, perpendicular to the stripe, indicating the side that the sample is on. Use a measuring wheel to establish the length of the site, 0.1-mile.
- Walk the survey segment from one end to the other, preferably facing on-coming traffic whenever possible, to identify all applicable highway assets within the survey segment and within NDOT ROW.
- If the sample location was moved because of a bridge, the bridge features for Task Group 161 must still be rated for that bridge. If the bridge spans a local road, river, or other feature not maintenance by NDOT maintenance crews, the portions of the bridge not visible from the state-maintenance road system do not need to be surveyed.
- Interchange on/off ramps are not included in the survey.
- Measure and record corresponding outcome measure data specific to each applicable asset, including the total quantity and the quantity deficient for each, on the Field Survey Rating Form. Use one form per site.
- Determine the LOS value for the specific maintenance task based on the outcome measure thresholds shown in the MAP Manual.
- Take notes and periodic photographs to justify LOS values.
- Record supplemental segment information: route name/number, sub-district, mile post begin and end, county, number of lanes, survey date and time, task specific outcome measure data, task specific LOS values, survey notes and corresponding

photograph image numbers.

- If the survey team wants to call attention to anything at the site, add appropriate notes at the bottom of the form.
- When finished at the site, retrieve the traffic safety devices, move to the next sample site, and repeat the process.
- Input the data into the provided computer spreadsheet as soon as possible, but no later than the day of the survey.
- Deliver the data collection forms and spreadsheet to the designated supervisor, as instructed, but not later than weekly.

## ***Rating Forms***

The Survey Rating Form is presented in Appendix A.

Information to be collected at each field survey segment will be recorded for all applicable assets within the survey segment. Data will be collected on hardcopy forms, however all data will be entered into an electronic spreadsheet as soon as possible after survey completion.

## Section 4 - Maintenance Tasks

### ***Maintenance Task Descriptions***

Maintenance tasks are grouped together based on the type and scope of work. The first three digits of a task number reflect the group it belongs to. For example, Task 101.07.01 – Crack Filling belongs to Group 101 – Flexible Pavement. Below is a numerical list of the maintenance groups:

- Group 101 – Flexible Pavement
- Group 112 – Miscellaneous Concrete Appurtenances
- Group 131 – Roadside Maintenance
- Group 133 – Roadside Cleanup
- Group 134/135 – Maintenance of Roadside Facilities/ Appurtenances
- Group 141 – Traffic Services
- Group 151 – Snow and Ice Control
- Group 161 – Structure Maintenance

The maintenance task numbers were developed to individually identify each specific task performed by NDOT maintenance personnel. All maintenance work performed is tracked by the Maintenance Management System (MMS) using the task number. Detailed information pertaining to crew size, equipment used, work operations and required materials can be found in the NDOT Maintenance Manual. A brief description of each maintenance task is provided below:

#### **Group 101 – Flexible Pavement**

##### **101.01.01 – Base and Surface Repair**

Remove unstable or failed base and surface materials, compact the subgrade as necessary, replace base and surface materials with approved materials in accordance with accepted compaction and lift requirements.

##### **101.02.01 – Hand Patching**

Restore lost surface due to pot-holing, raveling or other causes in which the vertical difference in the pavement exceeds 1-in (2.5 cm) in a 5 –ft (1.5 m) length in any direction. Construction and repair of shoulder dikes is included. Bituminous surfacing is placed with hand tools (plant mixed asphalt cement bituminous surfacing is the preferred material).

Permanent patches should be placed when practical; however, during periods of cold or wet weather and when time does not permit, temporary patches may be placed. Temporary patches may be made with premixed liquid asphalt bituminous surfacing or special proprietary mixes that do not require a pothole to be dry or primed.



### **101.02.02 – Maintenance Patching (less than 500 ft)**

Restore surface lost to raveling, settlement or other causes in which the vertical difference in pavement exceeds 1 in (2.5 cm) in a 10 ft (3 m) length in any direction. Bituminous surfacing is placed by machine. Plant mixed asphalt cement bituminous surfacing is the preferred material.

Machine patching may be a maximum of 2 in (5cm) in thickness. For the purpose of this task, no more than 300 cu yd. (229 cu m) or 550 tons of bituminous material may be used in any 10 MI (16km) section. Overlays that require more than 300 cu yd. (229 cu m) or 550 tons in any 10 mi (16km) section are considered Betterments and are included under Bituminous Surface Treatment.

### **101.02.03 – Maintenance Overlay/Inlay (over 500 ft)**

Restore surface that is cracked, uneven, broken, permeable to water and susceptible to loss of material and that the need is great enough for resurfacing. The length exceeds 500ft with the depth of more than ¾ inch. At site, set up traffic control devices, assign flaggers and pilot car. Tack surface with liquid asphalt and then spread premix by truck windrow spreader. The Motor Grader blades premix back and forth across the lane to level low spots and to provide an even surface plane. This may be accomplished with a Paver instead. Roll with Tandem Rollers, dress up edges and end connections with hand tool methods.

### **101.05.01 – Sand Seal**

Apply an emulsion or liquid asphalt binder to the roadway surface at a prescribed rate and apply a sand cover.

### **101.05.02 – Fog/Flush Seal**

Apply an emulsion or liquid asphalt to the roadway at a prescribed rate. Sand is applied at intersections and driveways to prevent tracking.

### **101.05.03 – Chip Seal**

Apply a binder to a roadway at a prescribed rate and cover the binder with rock screenings (chips). The binder is usually an emulsion with latex (LMCRS-2) or (LMCRS-2h). Emulsion without latex or liquid asphalt may also be used for certain applications.

### **101.05.04 – Scrub Seal**

Apply an emulsion or liquid asphalt binder to a roadway at a prescribed rate, sweep or squeegee the binder and cover the binder with sand.

### **101.05.05 – Micro Surfacing/Slurry Seal**

Renew an old asphalt surface and seal small cracks to prevent the penetration of water.

### **101.07.01 – Crack Filling**

Clean cracks in the pavement surface and fill them with rubberized asphalt, rejuvenating agent, emulsion, or liquid asphalt.

### **101.10.01 – Surface Profiling**

Removing surface irregularities and deteriorated pavements using a cold planer.

## **Group 112 – Miscellaneous Concrete Repair**

### **112.03.01 – Repair/Install Curb & Gutter**

Curbs and gutters which are damaged or deteriorated to the degree that they do not function as designed or pose a potential hazard to the public should be repaired or replaced as soon as possible.

### **112.05.01 – Repair/Replace/Extend Reinforced Concrete Boxes**

Repair/replace/extend concrete boxes that are broken or have deteriorated to a point as to be ineffective and may cause road base failure or flooding potential.

### **112.06.01 – Repair/Install Barrier Rail**

Repair/install barrier rail, which has deteriorated, chipped, spalled, or been damaged to the degree that it may not function as designed.

### **112.08.01 – Repair/Install Drop Inlets**

Repair/install deteriorated, chipped or damaged drop inlets which pose(s) a safety hazard or may cause drainage and erosion problems.

## **Group 131 – Roadside Maintenance**

### **131.01.01 – Clean Culverts**

Remove debris, sand and silt, which restricts culvert capacity. Cleaning may be performed using the culvert cleaner, or a water truck with high-pressure hoses and special nozzles or drags.

### **131.01.02 – Clean Drop Inlets**

Remove debris, sand and silt which restricts drop inlets. Drop Inlets are cleaned with the culvert cleaner, a vacuum sweeper, loader, backhoe or hand tools.

### **131.01.03 – Clean Slotted Drains**

Remove debris, sand and silt which restricts slotted drains. Slotted drains are cleaned with the culvert cleaner, a vacuum sweeper, loader, backhoe or hand tools.

### **131.01.04 – Clean Culvert Openings**

Remove debris, sand and silt which restricts culvert openings. Culvert Openings are cleaned with the culvert cleaner, a vacuum sweeper, loader, backhoe or hand tools. Cleaning culvert openings is restricted to an area within 30-ft (9m) of the culvert.

### **131.01.07 – Clean Sediment or Retention Basins**

Clean trapped sediment, sand or silt. This can be accomplished using a vacuum truck, loaders or backhoe.

### **131.05.01 – Repair/Replace/Extend or Install Culverts**

Repair and replace culverts that have been damaged or are deteriorated to the point of being structurally deficient. Adding minor extensions to culverts that were

of insufficient length when they were originally installed is also included. A minor extension is defined as one that is 6-ft (2 m) or less in length.

#### **131.05.03 – Repair/Reshape/Construct Ditches or Channels**

Dress and shape ditches to the depth and cross section to which they were originally constructed or were subsequently improved. Dressing and shaping ditches is usually performed with a motor grader or a loader. If substantial material is hauled from the ditch, the appropriate task is “Cleaning Ditches”, Task No. 131.05.05.

#### **131.05.05 – Clean Cuts/Ditches Up To Culvert Wings**

Remove debris, silt and other foreign material from ditches to the depth and cross section to which they were originally constructed or have been improved. Ditch cleaning requires material to be hauled away from the ditch. If ditches are reshaped with a motor grader and do not involve hauling material, the appropriate task is “Repair, or Reshape Ditches”, Task No. 131.05.03.

#### **131.06.01 – Repair Fill and Cut Slopes**

Repair roadway cut and fill slope(s) that have deteriorated from erosion or have been damaged by other means.

#### **131.07.01 – Blade Shoulders**

Blade unpaved shoulders with a motor grader. The differential between pavement and shoulder is 2” or greater. If a substantial amount of material is required to repair the slope, the work should be classed as “Fill Slope Repair”, Task No. 131.06.01.

#### **131.08.01 – Flailing/Mowing/Dragging**

Roadside vegetation is a fire hazard or has reached 12” in height is removed along the shoulder by mowing, flailing or burning.

#### **131.08.05 – Chemical Weed Spray**

Roadside vegetation growing 4” to 6” around posts, guardrails, shoulders or on slopes is controlled using approved chemicals applied at a prescribed rate with approved and calibrated equipment, up to 14 feet from edge of pavement.

#### **131.08.06 – Hand Weeding/Burning**

Remove unwanted vegetation reaching 6” to 12” or more in height around roadside appurtenances such as signposts and guardrails using hand methods where removal by chemicals or mechanical methods is not advisable or practical. This task also includes trimming trees within the right-of-way.

### **Group 133 – Roadside Cleanup**

#### **133.01.01 – Remove Debris**

Remove litter, debris and trash from the right-of-way.

#### **133.01.03 – Empty Litter Barrels**

Empty litter containers located along highways and pick up litter around the containers.

### **133.03.01 – Sweeping-Pull Broom/Self Propelled Broom**

Clean dirt and sand from the travel way, shoulders and approaches by sweeping.

### **133.05.01 – Pickup Broom Sweeping**

Sweep up dirt, debris and litter with a pickup broom from the paved shoulders along curbs and gutters and in paved ditches.

## **Group 134/135 – Maintenance of Roadside Facilities and Appurtenances**

### **134.01.01 – Maintain Rest Areas**

Provide all services necessary for maintaining a rest area such as removing litter from the ground or litter containers, cleaning and repairing tables or benches, cleaning restrooms, maintaining buildings, and RV dump stations, watering, mowing and fertilizing turf areas, trimming and fertilizing landscaped areas.

### **134.03.01 – Landscape with Turf**

Mow, water, fertilize, weed, control insects and replace turf in landscaped areas that are primarily turf.

### **134.03.02 – Landscape without Turf**

Water, fertilize, weed, prune, and provide for insect control in areas that are landscaped with shrubs, trees and ground cover without turf.

### **134.03.03 – Maintain Rock Mulch**

Clean litter from rock mulch or replace rock mulch that has been displaced, scattered or the color scheme or pattern has been altered due to accident or vandals.

### **135.01.01 – Repair/Install Barbed Wire, Fabric Fences and Gates**

Repair and replace existing right-of-way and control of access fencing and gates. Controls of access fences are those fences constructed to preclude access where the Department purchased access rights to the highway from abutting property owners.

### **135.01.02 – Repair/Install Chain Link, Snow Fence and Gates**

Repairing and replace existing right-of-way and control of access fencing and gates. Preserving the usefulness of chain link and snow fencing. Snow fence is maintained for the control of snow that is windblown or in a location that has a buildup problem and a safety problem for the traveling public.

### **135.01.03 – Repair/Install Glare Screen or Glare Fence**

Repair/install Glare Screen/Fencing for the safety of the traveling public, when destroyed by accident or a safety hazard exists due to glare.

## **Group 141 – Traffic Services**

### **141.01.01 – Repair/Replacement of Traffic Signs**

Repair/replace existing traffic signs that no longer provide authority as traffic control or information devices.

#### **141.02.01 – Repair/Replace/Install Guard Rail**

Repair/replace damaged or deteriorated panels, replace damaged posts, and straighten or align posts and panels. This task also includes adding 50-ft (15m) or less to existing guardrail. Maintenance of Impact Attenuators and End Treatments are covered under Task Repair/Replace Impact Attenuators (Task No. 141.02.04).

#### **141.02.03 – Repair/Replace/Install End Treatment or Impact Attenuator**

Repair/ replace damaged Impact Attenuators and End Treatments that no longer function as a safety device.

#### **141.02.06 – Repair/Replace/Install Cable Barrier**

Repair/ replace Cable Barriers when the barrier has lost the ability to function as designed, due to accident or vandalism.

#### **141.04.01 – Paint Stripe and Solid Lines**

Paint solid and broken lines on pavement surfaces and apply glass beads to the lines as they are painted.

#### **141.06.01 – Remove/Install Raised Pavement Markings**

Remove or install raised traffic markings, buttons and reflective pavement markers (recessed). Markers can be reflective or non-reflective and are installed using either epoxy or bitumen adhesives. In snow areas reflective pavement markers are recessed into the pavement.

#### **141.08.01 – Remove/Replace Pavement Markings**

Place various markings, legends and symbols on the pavement surface. Markings placed on the pavement surface include crosswalks and stop bars. Symbols and legends include directional arrows, word messages and letters for railroad crossings.

#### **141.09.01 – Street Lights**

Replace burned out lights, clean dirty lenses, replace of dirty or damaged lenses, repair or replace damaged poles, repair or replace corroded, broken or shorted wires.

#### **141.09.02 – Structure & Tunnel Lights**

Replace burned out lights, clean dirty lenses, replace dirty or damaged lenses, repair or replace damaged fixtures, repair or replace corroded, broken or shorted wires.

#### **141.09.03 – High Mast Lights**

Replace burned out lights, clean dirty lenses, replace dirty or damaged lenses, repair or replace damaged fixtures, repair or replace corroded, broken or shorted wires.

#### **141.09.05– Overhead Sign Lighting**

Replace burned out lights, clean dirty lenses, replace dirty or damaged lenses, repair or replace damaged fixtures, repair or replace corroded, broken or shorted wires.

#### **141.11.01– Maintain Miscellaneous Roadway Markers**

Replace damaged or missing sight plates, repair or replace bent or broken guideposts (including metal or flexible posts), repair or install sight plates on guardrails, replace damaged or missing milepost panels, repair or replace bent or broken mileposts, maintain right-of-way markers.

### **Group 151 – Snow and Ice Control**

#### **151.01.01– Snow & Ice Removal**

Remove snow and ice from the pavement surface using push plows or motor graders, remove snow from the travel way using rotary snow plows, removing snow that has accumulated alongside the travel way, which cannot be removed by push-plows or motor graders; rotary plow to cut access areas to down drain and culvert inlets. Post chain/snow tire requirements by turning appropriate signs so they face traffic, apply abrasive materials to improve traction, apply anti-icing materials, widen to provide storage space for snow accumulations, haul accumulated snow to designated sites and clean snow and ice from down drains and inlets.

#### **151.02.01– Pre-treatment**

Follow the Snow and Ice Control Plan established by each District, spread the approved anti-icing agent on the pavement surface for the full width of the traveled way.

#### **151.04.01– Install/Remove Snow Markers**

Install and maintain snow poles in areas subject to heavy drifting and snowfall.

### **Group 161 – Structure Maintenance**

#### **161.01.05– Clean or Repair Structure Drainage**

Clean drains and tighten or replace bolts and nuts.

#### **161.01.07– Repair Retaining, Sound or Bin Walls**

Repair damage or deterioration in various wall components, clean and paint, tighten or replace bolts and nuts.

#### **161.02.02– Sweep and Remove Debris from Structures**

Remove deposited debris and sand from structures.

### **Cause of Maintenance – Remove Graffiti from Structures**

Remove graffiti from structures and repaint necessary areas.

## Section 5 - Task Outcome Criteria

### ***Maintenance Task Outcome Rating Criteria***

MAP utilizes outcome-based performance measures with a rating scale of A (best) to F (worst) to report the Level of Service provided for each asset associated with a maintenance task. Each performance measure consists of a condition indicator (deficiency or condition to be measured), outcome measure (unit of measure), and LOS threshold for each maintenance task. A threshold is the range of allowable deficiencies or conditions for each service level.

The performance measures for the assets associated with the various task groups are shown on the following pages. Pictures are provided to show typical asset types and deficiencies. Some tasks have been combined to form a single performance measure. The Level of Service determination and data collection for Group 134 – Maintenance of Roadside Facilities and Appurtenances and Group 151 – Snow and Ice Control differ from other Groups due to the uniqueness of the maintenance tasks. Instead of collecting data and determining the LOS for each Group 134/151 task, sample rating sheets have been provided detailing the data to be collected for Rest Areas and Snow and Ice Control. The Group 134/151 sample rating sheets are located in numerical sequence with the other groups.

### Group 112 – Miscellaneous Concrete Repair

<b>MAP Task Name:</b>	<b>Curb and Gutter – Structural</b>				
<b>MMS Task Number:</b>	112.03.01				
<b>MMS Task Name:</b>	Repair/Install Curb & Gutter				
<b>Indicator:</b>	The curb and gutter is failing, cracked, faulting, chipped or spalled.				
<b>Outcome Measure:</b>	Linear feet of deficient curb & gutter (C&G)				
<b>Outcome Unit:</b>	% Deficient: $(100 * \text{Deficient LINFT of C\&G} / \text{Total LINFT of C\&G})$				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-2.0%	2.1-5.0%	5.1-10.0%	10.1-20.0%	>20.0%

Deficient Curb and Gutter:





## Group 112 – Miscellaneous Concrete Repair

<b>MAP Task Name:</b>	<b>Reinforced Concrete Boxes and Concrete Pipe – Structural</b>				
<b>MMS Task Number:</b>	112.05.01				
<b>MMS Task Name:</b>	Repair/Replace/Extend Reinforced Concrete Boxes				
<b>Indicator:</b>	Reinforced Concrete Boxes have deteriorated by cracking of the concrete, or joints are separating between box segments to a point of structural weakness, thus creating possible damage to the roadway or potentially plugging the pipe to a point of restricting designed drainage flows.				
<b>Outcome Measure:</b>	Number of damaged or deficient reinforced concrete boxes (RCB).				
<b>Outcome Unit:</b>	% Deficient: $(100 * \text{No. of Deficient RCB} / \text{Total No. of RCB})$				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-1.0%	1.1-3.0%	3.1-5.0%	5.1-10.0%	>10.0%

Deficient Reinforced Concrete Box:



## Group 112 – Miscellaneous Concrete Repair

<b>MAP Task Name:</b>	<b>Barrier Rail – Structural</b>				
<b>MMS Task Number:</b>	112.06.01				
<b>MMS Task Name:</b>	Repair/Install Barrier Rail				
<b>Indicator:</b>	Deteriorated, chipped, spalled or damaged concrete Barrier Rail.				
<b>Outcome Measure:</b>	Linear feet of deficient concrete barrier				
<b>Outcome Unit:</b>	% Deficient: $(100 * \text{Deficient LINFT of Barrier} / \text{Total LINFT of Barrier})$				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-1.0%	1.1-3.0%	3.1-5.0%	5.1-10.0%	>10.0%

Deficient Concrete Barrier Rail:



## Group 112 – Miscellaneous Concrete Repair

<b>MAP Task Name</b>	<b>Drop Inlets – Structural</b>				
<b>MMS Task Number:</b>	112.08.01				
<b>MMS Task Name:</b>	Repair/Install Drop Inlets				
<b>Indicator:</b>	Drop Inlets are deteriorated, chipped, or damaged, or there is an abrupt change in surface elevation adjacent to the structure that is beyond designed use and creates a hazard for the traveling public.				
<b>Outcome Measure:</b>	The number of damaged or deficient drop inlets (DI)				
<b>Outcome Unit:</b>	% Deficient: $(100 * \text{Deficient No. of DI} / \text{Total No. of DI})$				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-1.0%	1.1-3.0%	3.1-5.0%	5.1-10.0%	>10.0%

Deficient Drop Inlet:



## Group 131 – Roadside Maintenance

<b>MAP Task Name:</b>	<b>Culverts, Drop Inlets and Slotted Drains – Blocked by Debris</b>				
<b>MMS Task Number:</b>	131.01.01, 131.01.02 & 131.01.03				
<b>MMS Task Name:</b>	Clean Culverts, Drop Inlets and Slotted Drains				
<b>Indicator:</b>	Culverts, Drop Inlets and Slotted Drains are clogged or partially filled with sediment or debris which negatively restricts the design flow capacity and may create a flooding potential on the right of way.				
<b>Outcome Measure:</b>	The number of culverts, drop inlets and slotted drains greater than 20% full, blocked or otherwise deficient. Measure culverts filled depth from inside diameter of pipe. Measure drop inlets and slotted drains by coverage of grate top greater than 20% full.				
<b>Outcome Unit:</b>	% Deficient: $(100 * \text{Deficient No. of Drains} / \text{Total No. of Drains})$				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-2.0%	2.1-5.0%	5.1-10.0%	10.1-20.0%	>20.0%

Determination of Culverts 20% full by pipe size:

<u>Pipe Diameter</u>	<u>Pipe Depth From Top of Pipe to 20% Full Height</u>
15"	11.2"
18"	13.4"
24"	17.9"
30"	22.4"
36"	26.9"
42"	31.3"

Deficient Culvert, Drop Inlet, and Slotted Drain:





## Group 131 – Roadside Maintenance

<b>MAP Task Name:</b>	<b>Culvert Opening Area – Blocked by Debris</b>				
<b>MMS Task Number:</b>	131.01.04				
<b>MMS Task Name:</b>	Clean Culvert Openings				
<b>Indicator:</b>	Inlets or outlets are filled with debris and cause a flood hazard.				
<b>Outcome Measure:</b>	Number of culvert openings 20% full, or otherwise deficient				
<b>Outcome Unit:</b>	% Deficient: (100 * Deficient No. of Culvert Openings / Total No. of Culvert Openings)				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-2.0%	2.1-5.0%	5.1-10.0%	10.1-20.0%	>20.0%

### Deficient Culvert Openings:





## Group 131 – Roadside Maintenance

<b>MAP Task Name:</b>	<b>Sediment or Retention Basins</b>				
<b>MMS Task Number:</b>	131.01.07				
<b>MMS Task Name:</b>	Clean Sediment or Retention Basins				
<b>Indicator:</b>	The basin inlet pipe is greater than 25% filled with sediment.				
<b>Outcome Measure:</b>	Number of basins 25% (or greater) full with sediment build-up.				
<b>Outcome Unit:</b>	% Deficient: (100 * Deficient No. of Basins/ Total No. of Basins)				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-3.0%	3.1-7.0%	7.1-15.0%	15.1-30.0%	>30.0%

Detention basin greater than 25% full of sediment:



## Group 131 – Roadside Maintenance

<b>MAP Task Name:</b>	<b>CMP Culverts - Structural</b>				
<b>MMS Task Number:</b>	131.05.01				
<b>MMS Task Name:</b>	Repair/Replace/Extend or Install Culverts				
<b>Indicator:</b>	Culverts have deteriorated to a point of structural weakness or rusting through, thus creating possible damage to the roadway or plugging the pipe to a point of restricting drainage. Safety sloping and erosion control issues dictate the need for extending the culverts.				
<b>Outcome Measure:</b>	Number of culverts that are deficient				
<b>Outcome Unit:</b>	% Deficient: $(100 * \text{Deficient No. of Culverts} / \text{Total No. of Culverts})$				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-1.0%	1.1-3.0%	3.1-5.0%	5.1-10.0%	>10.0%

Deficient Culvert:





## Group 131 – Roadside Maintenance

<b>MAP Task Name:</b>	<b>Ditches and Channels - Structural</b>				
<b>MMS Task Number:</b>	131.05.03				
<b>MMS Task Name:</b>	Repair/Reshape/Construct Ditches or Channels				
<b>Indicator:</b>	Ditch has a break in it and does not control the flow of water.				
<b>Outcome Measure:</b>	Linear feet of deficient channels				
<b>Outcome Unit:</b>	% Deficient: (100 * Deficient LINFT of Channels / Total LINFT of Channels)				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-2.0%	2.1-5.0%	5.1-10.0%	10.1-20.0%	>20.0%

Deficient Channel:



## Group 131 – Roadside Maintenance

<b>MAP Task Name:</b>	<b>Ditches and Channels – Blocked by Debris</b>				
<b>MMS Task Number:</b>	131.05.05				
<b>MMS Task Name:</b>	Clean Cuts & Ditches Up To Culvert Wings				
<b>Indicator:</b>	Foreign material and vegetation accumulated in ditches impedes flow of water.				
<b>Outcome Measure:</b>	Linear feet of ditches exceeding 25% full with sediment/debris.				
<b>Outcome Unit:</b>	% Deficient: $(100 * \text{Deficient LINFT of Ditches} / \text{Total LINFT of Ditches})$				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-1.0%	1.1-5.0%	5.1-10.0%	10.1-15.0%	>15.0%

Deficient Ditch:



## Group 131 – Roadside Maintenance

<b>MAP Task Name:</b>	<b>Fill and Cut Slopes</b>				
<b>MMS Task Number:</b>	131.06.01				
<b>MMS Task Name:</b>	Repair Fill and Cut Slopes				
<b>Indicator:</b>	Slope has deteriorated to a point of endangering the safety of the traveling public and affects the structural integrity of the highway.				
<b>Outcome Measure:</b>	Linear feet of slides or erosion encroaching on, or undermining the shoulder or traveled way, measured parallel to shoulder.				
<b>Outcome Unit:</b>	% Deficient: $(100 * \text{Deficient LINFT of Slopes} / \text{Total LINFT of Slopes})$				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-1.0%	1.1-3.0%	3.1-5.0%	5.1-10.0%	>10.0%

Deficient Slopes:



## Group 131 – Roadside Maintenance

<b>MAP Task Name:</b>	<b>Shoulder Drop Off</b>				
<b>MMS Task Number:</b>	131.07.01				
<b>MMS Task Name:</b>	Blade Shoulders				
<b>Indicator:</b>	Differential between pavement edge and shoulder is 2" or more. Water is eroding the gravel shoulder material away. Only paved shoulders with less than 12" width between edge of pavement and the shoulder stripe should be measured for deficiencies.				
<b>Outcome Measure:</b>	Linear feet of deficient shoulder				
<b>Outcome Unit:</b>	% Deficient: $(100 * \text{Deficient LINFT of Shoulders} / \text{Total LINFT of Shoulders})$				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-1.0%	1.1-3.0%	3.1-5.0%	5.1-10.0%	>10.0%

Deficient Shoulder:



## Group 133 – Roadside Cleanup

<b>MAP Task Name:</b>	<b>Debris and Litter</b>				
<b>MMS Task Number:</b>	133.01.01				
<b>MMS Task Name:</b>	Remove Debris / Litter				
<b>Indicator:</b>	Right of way appears unsightly and aesthetically displeasing. (Pertains only to ROW limits that can be seen from the roadway).				
<b>Outcome Measure:</b>	Number of fist sized objects or larger per centerline mile				
<b>Outcome Unit:</b>	No. of Objects/Mile: (No. of Objects in sample * 10)				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-750	751-1500	1501-2250	2251-3000	>3000

Fist-sized (or larger) litter and debris visible from shoulder:





## Group 133 – Roadside Cleanup

<b>MAP Task Name:</b>	<b>Litter Barrels</b>				
<b>MMS Task Number:</b>	133.01.03				
<b>MMS Task Name:</b>	Empty Litter Barrels				
<b>Indicator:</b>	Litter barrels along the highway are full to overflowing.				
<b>Outcome Measure:</b>	Number of full litter barrels				
<b>Outcome Unit:</b>	% Full: $(100 * \text{No. of Full Barrels} / \text{Total No. of Barrels})$				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-10%	11-30%	31-50%	51-90%	>90%

Full litter barrels:



## Group 133 – Roadside Cleanup

<b>MAP Task Name:</b>	<b>Roadway Sweeping</b>				
<b>MMS Task Number:</b>	133.03.01 & 133.05.01				
<b>MMS Task Name:</b>	Sweeping of Paved Roadway Surfaces with Pulled/Self-Propelled Broom				
<b>Indicator:</b>	Dirt and sand accumulates on paved travel way, structures, shoulders, approaches, ditches, curbs and gutters.				
<b>Outcome Measure:</b>	Square feet of paved surface with accumulated dirt and sand				
<b>Outcome Unit:</b>	% Deficient Paved Surfaces: (100 * SQFT of Paved Surface with Dirt and Sand / Total SQFT of Paved Surface)				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-5.0%	5.1-10.0%	10.1-20.0%	20.1-40.0%	>40.0%

Paved Surface with Accumulated Dirt and Sand:



## Group 134/135 – Maintenance of Roadside Facilities/Appurtenances

Note – Task 134.01.01 – Maintain Rest Areas is rated using the Rest Area Rating Form in the Appendix. The remaining Group 134/135 tasks in this section are included on the standard Field Survey Rating Form.

<b>MAP Task Name:</b>	<b>Rock Mulch</b>				
<b>MMS Task Number:</b>	134.03.03				
<b>MMS Task Name:</b>	Maintain Rock Mulch				
<b>Indicator:</b>	Rock mulch has been displaced or scattered, debris or litter is unsightly, or the color scheme or pattern has been altered due to accident or vandals.				
<b>Outcome Measure:</b>	Square feet of damaged or defective rock mulch and unsightly debris				
<b>Outcome Unit:</b>	% Deficient: (100 * Deficient SQFT of Rock Mulch / Total SQFT of Rock Mulch)				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-1.0%	1.1-3.0%	3.1-5.0%	5.1-10.0%	>10.0%

Deteriorated Rock Mulch:





## Group 134/135 – Maintenance of Roadside Facilities/Appurtenances

<b>MAP Task Name:</b>	<b>Barbed Wire, Fabric, Chain Link and Snow Fence</b>				
<b>MMS Task Number:</b>	135.01.01 & 135.01.02				
<b>MMS Task Name:</b>	Repair/Install Barbed Wire Fences, Fabric Fences, Chain Link Fences, Snow Fence and Gates				
<b>Indicator:</b>	Area of broken wire, open fence, bent or downed posts. Fence and gates need to perform their intended function of acting as a barrier to the highway.				
<b>Outcome Measure:</b>	Linear Feet of damaged or defective wire, open fence, bent or downed posts				
<b>Outcome Unit:</b>	% Deficient: $(100 * \text{Deficient LINFT of Fence} / \text{Total LINFT of Fence})$				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-5.0%	5.1-10.0%	10.1-20.0%	20.1-40.0%	>40.0%

Deteriorated Fence:



**Group 134/135 – Maintenance of Roadside Facilities/Appurtenances**

<b>MAP Task Name:</b>	<b>Snow Fence</b>				
<b>MMS Task Number:</b>	135.01.02 (Snow Fence Portion)				
<b>MMS Task Name:</b>	Repair/Install Snow Fence				
<b>Indicator:</b>	Area of broken slats, open fence, or downed posts.				
<b>Outcome Measure:</b>	Linear Feet of damaged or defective slats, open fence or downed posts				
<b>Outcome Unit:</b>	% Deficient: (100 * Deficient LINFT of Snow Fence / Total LINFT of Snow Fence)				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-2.0%	2.1-5.0%	5.1-10.0%	10.1-20.0%	>20.0%

Deteriorated Snow Fence:



## Group 134/135 – Maintenance of Roadside Facilities/Appurtenances

<b>MAP Task Name:</b>	<b>Glare Screen and Glare Fence</b>				
<b>MMS Task Number:</b>	135.01.03				
<b>MMS Task Name:</b>	Repair/Install Glare Screen Or Glare Fence				
<b>Indicator:</b>	Glare Screen and Glare Fence destroyed by accident or a safety hazard exists due to glare.				
<b>Outcome Measure:</b>	Linear feet of damaged or defective glare screen or glare fence				
<b>Outcome Unit:</b>	% Deficient: (100 * Deficient LINFT of Glare Screen / Total LINFT of Glare Screen)				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-2.0%	2.1-5.0%	5.1-10.0%	10.1-20.0%	>20.0%

Deteriorated Glare Screen or Glare Fence:



## Group 141 - Traffic Services

<b>MAP Task Name:</b>	<b>Traffic Signs</b>				
<b>MMS Task Number:</b>	141.01.01				
<b>MMS Task Name:</b>	Repair/Replacement Of Traffic Signs				
<b>Indicator:</b>	Signs or Sign-Posts are damaged or deteriorated so that they no longer provide authority as traffic control or information devices. Note -Two sign faces on one pole are counted as two signs.				
<b>Outcome Measure:</b>	Number of regulatory/warning signs damaged or deficient				
<b>Outcome Unit:</b>	% Deficient: $(100 * \text{Deficient No. of Signs} / \text{Total No. of Signs})$				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-1.0%	1.1-2.0%	2.1-5.0%	5.1-10.0%	>10.0%

Damaged Traffic Sign:



**Group 141 - Traffic Services**

<b>MAP Task Name:</b>	<b>Guardrail</b>				
<b>MMS Task Number:</b>	141.02.01				
<b>MMS Task Name:</b>	Repair/Replace/Install Guardrail				
<b>Indicator:</b>	Damaged or deteriorated panels, damaged posts, or misaligned posts and panels.				
<b>Outcome Measure:</b>	Linear feet of deficient guardrail.				
<b>Outcome Unit:</b>	% Deficient: (100 * LINFT of Deficient Guardrail / Total LINFT of Guardrail)				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-1.0%	1.1-2.0%	2.1-5.0%	5.1-10.0%	>10.0%

Damaged guardrail:



## Group 141 - Traffic Services

<b>MAP Task Name:</b>	<b>Guardrail End Treatments and Impact Attenuators</b>				
<b>MMS Task Number:</b>	141.02.03				
<b>MMS Task Name:</b>	Repair/Replace/Install End Treatment or Impact Attenuator				
<b>Indicator:</b>	Guardrail End Section or Impact Attenuator is damaged or displaced so that it no longer functions as a safety device.				
<b>Outcome Measure:</b>	Number of deficient end sections or impact attenuators				
<b>Outcome Unit:</b>	% Deficient: (100 * Deficient No. Attenuators / Total No. of Attenuators)				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0%	0.1-1.0%	1.1-2.0%	2.1-3.0%	>3.0%

Deficient Impact Attenuator/ End Treatment:





## Group 141 - Traffic Services

<b>MAP Task Name:</b>	<b>Cable Barrier Rail</b>				
<b>MMS Task Number:</b>	141.02.06				
<b>MMS Task Name:</b>	Repair/Replace/Install Cable Barrier				
<b>Indicator:</b>	Damaged or deteriorated cable, or damaged or misaligned posts, so that the barrier has lost the ability to function as designed.				
<b>Outcome Measure:</b>	Linear feet of deficient cable barrier.				
<b>Outcome Unit:</b>	% Deficient: (100 * Deficient LINFT of Cable / Total LINFT of Cable)				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-1.0%	1.1-2.0%	2.1-5.0%	5.1-10.0%	>10.0%

Deficient Cable Barrier:



## Group 141 - Traffic Services

<b>MAP Task Name:</b>	<b>Paint Striping</b>				
<b>MMS Task Number:</b>	141.04.01				
<b>MMS Task Name:</b>	Paint Stripe and Solid Line				
<b>Indicator:</b>	Traffic line has noticeable wear with loss of visibility or paint, or is obliterated.				
<b>Outcome Measure:</b>	Linear feet of striping with noticeable wear exceeding 50% of original visual and retro reflective effectiveness. Skip lines are considered solid lines for measurement purposes.				
<b>Outcome Unit:</b>	% Deficient: $(100 * \text{Deficient LINFT of Striping} / \text{Total LINFT of Striping})$				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-15.0%	15.1-30.0%	30.1-42.5%	42.6-50.0%	>50.0%

Deficient Paint Stripes:





## Group 141 - Traffic Services

<b>MAP Task Name:</b>	<b>Raised Pavement Markers</b>				
<b>MMS Task Number:</b>	141.06.01				
<b>MMS Task Name:</b>	Remove/Install Raised Pavement Markers (RPMs)				
<b>Indicator:</b>	Raised pavement markers are broken, missing, or ineffective.				
<b>Outcome Measure:</b>	Number of deficient raised pavement markers				
<b>Outcome Unit:</b>	No. of Deficient Markers/Mile: (No. of Def Markers in sample * 10)				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-5	6-10	11-20	21-30	>30

Deficient and Missing Raised Pavement Markers:



## Group 141 - Traffic Services

<b>MAP Task Name:</b>	<b>Pavement Markings</b>				
<b>MMS Task Number:</b>	141.08.01				
<b>MMS Task Name:</b>	Remove/Replace Pavement Markings				
<b>Indicator:</b>	Pavement Markings are worn with loss of paint, or loss of retro-reflectivity.				
<b>Outcome Measure:</b>	Number of markings worn 50%, or greater, of original visual and retro reflective effectiveness.				
<b>Outcome Unit:</b>	% Deficient: $(100 * \text{Deficient No. of Markings} / \text{Total No. of Markings})$				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-10%	11-30%	31-50%	51-90%	>90%

Deficient Pavement Markings:



## Group 141 - Traffic Services

<b>MAP Task Name:</b>	<b>Highway Lighting</b>				
<b>MMS Task Number:</b>	141.09.01, 141.09.02, 141.09.03 & 141.09.05				
<b>MMS Task Name:</b>	Highway Lighting				
<b>Indicator:</b>	There are burned out lamps, damaged poles, damaged junction-boxes or broken circuits. <b>(SURVEY AT NIGHT)</b>				
<b>Outcome Measure:</b>	Number of highway lights malfunctioning				
<b>Outcome Unit:</b>	% Malfunctioning: $(100 * \text{Malfunctioning No. of Lights} / \text{Total No. of Lights})$				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-5.0%	5.1-7.5%	7.6-10.0%	10.1-20.0%	>20.0%

Example of Highway Lighting (High Mast Lights):



## Group 141 - Traffic Services

<b>MAP Task Name:</b>	<b>Roadway Markers</b>				
<b>MMS Task Number:</b>	141.11.01				
<b>MMS Task Name:</b>	Maintain Miscellaneous Roadway Markers				
<b>Indicator:</b>	Markers or posts have deteriorated so that they no longer provide traffic control or information as required.				
<b>Outcome Measure:</b>	Number of roadway markers or guideposts that are broken or missing				
<b>Outcome Unit:</b>	% Deficient: (100 * Deficient No. of Markers / Total No. of Markers)				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-1.0%	1.1-5.0%	5.1-10.0%	10.1-20.0%	>20.0%

Deficient Roadway Markers and Guide Posts:



## Group 161 – Structure Maintenance

<b>MAP Task Name:</b>	<b>Bridge/Structure Drainage</b>				
<b>MMS Task Number:</b>	161.01.05				
<b>MMS Task Name:</b>	Clean or Repair Structure Drainage				
<b>Indicator:</b>	Drainage Structures are clogged or partially filled with sediment or debris which negatively restricts the design flow capacity and may create a flooding potential.				
<b>Outcome Measure:</b>	Number of drainage structures greater than 20% full, blocked, or otherwise deficient.				
<b>Outcome Unit:</b>	% Deficient: $(100 * \text{Deficient No. of Drainage Structures} / \text{Total No. of Drainage Structures})$				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-2.0%	2.1-5.0%	5.1-10.0%	10.1-20.0%	>20.0%

Deficient Structure Drainage:



## Group 161 – Structure Maintenance

<b>MAP Task Name:</b>	<b>Retaining, Sound and Bin Walls</b>				
<b>MMS Task Number:</b>	161.01.07				
<b>MMS Task Name:</b>	Repair Retaining, Sound or Bin Walls				
<b>Indicator:</b>	Deteriorated, chipped, or poor delineation on Retaining, Sound or Bin Walls.				
<b>Outcome Measure:</b>	Square feet of retaining, sound or bin walls deteriorated/chipped				
<b>Outcome Unit:</b>	% Deficient: (100 * Deficient SQFT of Wall / Total SQFT of Wall)				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-2.0%	2.1-5.0%	5.1-10.0%	10.1-20.0%	>20.0%

Deficient Wall:



## Group 161 – Structure Maintenance

<b>MAP Task Name:</b>	<b>Bridge/Structure Sweeping</b>				
<b>MMS Task Number:</b>	161.02.02				
<b>MMS Task Name:</b>	Sweep and Remove Dirt and Debris from Structures				
<b>Indicator:</b>	Dirt and sand has accumulated on structure.				
<b>Outcome Measure:</b>	Square feet of Deficient Structure Surface Area				
<b>Outcome Unit:</b>	% Deficient: $(100 * \text{Deficient SQFT with dirt and sand} / \text{Total SQFT of Structure Surface Area})$				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-5.0%	5.1-10.0%	10.1-20.0%	20.1-40.0%	>40.0%

[Picture Not Available]



## Graffiti

<b>MAP Task Name:</b>	<b>Graffiti</b>				
<b>MMS Task Number:</b>	Cause of Maintenance				
<b>MMS Task Name:</b>	Remove Graffiti				
<b>Indicator:</b>	Assets have Graffiti which may be offensive to the traveling public.				
<b>Outcome Measure:</b>	Square feet of surface area with graffiti				
<b>Outcome Unit:</b>	SQFT of Deficient Surface Area: (Total SQFT of Graffiti)				
<b>Outcome Thresholds:</b>	<b>Level of Service</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0-10	11-20	21-50	51-100	>100

Graffiti on Structure and Sign:





## APPENDIX A – RATING FORMS

Figure A-1 - Standard Field Survey Rating Form

## MAP Field Survey Rating Form

Survey No		Milepost Begin:			
Rte.Type(	IR US SR	Milepost End:			
Sub-Distri	1 2 3 4 5 6	County:			
No. Lanes		Survey Personnel:			
Date (mm					
Time of Day (00:00 A					
MAP TASK NAME &	OUTCOME UNIT	ASSET DEFICIENC	ASSET TOTAL	NOTES/CALCS	PHOTO IMAGE #
<b>Group 101 - Flexible</b>					
101 - Average PSI Number for Sample Section	(from Pave. Mgmt. Sys.)				
<b>Group 112 - Miscellaneous Concrete Repair</b>					
Curb & Gutter - STRUCTURAL - 112.03.01	% Deficient: (100*Deficient LF of C&G / Total LF of C&G)				
RCBs and Concrete Pipe - STRUCTURAL - 112.05.01	% Deficient: (100*Deficient #RCB / Total #RCB)				
Barrier Rail - STRUCTURAL - 112.06.01	% Deficient: (100*Deficient LF of Barrier Rail / Total LF Barrier Rail)				
Drop Inlets - STRUCTURAL - 112.08.01	% Deficient: (100*Deficient #DI's / Total #DI's)				
<b>Group 133 - Roadside Cleanup</b>					
Debris and Litter - 133.01.01	Each occurrence per centerline mile: (Total EA) * (5280FT/Survey Segment)				
Litter Barrels - 133.01.03	% Full: (100*Full Barrels / Total Barrels)				
Roadway Sweeping - 133.03.01 & 133.05.01	% Deficient: (100*Paved SQFT of Surface with Dirt and Sand / Total SQFT of Paved Surface)				

Group 131 - Roadside Maintenance					
RCBs and Concrete Pipe - DEBRIS - 131.01.01	% Deficient: (100*Deficient #Drains and Culverts / Total #Drains and Culverts)				
Drop Inlets - DEBRIS - 131.01.02	% Deficient: (100*Deficient #Drop inlets / Total #Drop				
Slotted Drains - DEBRIS - 131.01.03	% Deficient: (100*Deficient # of Slotted Drains / Total # of Slotted Drains)				
Culvert Opening Area - DEBRIS - 131.01.04	% Deficient: (100*Deficient # Culvert Openings / Total # Culvert Openings)				
Sediment or Retention Basins - 131.01.07	% Deficient: (100*Deficient # Basins/ Total # Basins)				
CMP Culverts - Structural - 131.05.01	% Deficient: (100*Deficient # Culverts / Total # Culverts)				
Ditches and Channels - STRUCTURAL - 131.05.03	% Deficient: (100*Deficient LF of Channels / Total LF of Channels)				
Ditches and Channels - DEBRIS - 131.05.05	% Deficient: (100*Deficient LF of Ditches / Total LF of Ditches)				
Fill and Cut Slopes - 131.06.01	% Deficient: (100*Deficient LF of Slopes / Total LF of Slopes)				
Shoulder Drop Off - 131.07.01	% Deficient: (100*Deficient LF of Shoulders / Total LF of				

Group 141 - Traffic Services					
Traffic Signs - 141.01.01	% Deficient: (100*Deficient				
Guardrail - 141.02.01	% Deficient: (100*Deficient LF of				
Guardrail End Treatments and Impact Attenuators - 141.02.03	% Deficient: (100*Deficient # of Attenuators / Total # of Attenuators)				
Cable Barrier Rail - 141.02.06	% Deficient: (100*Deficient LF of Cable Barrier / Total LF of Cable				
Paint Striping - 141.04.01	% Deficient: (100*Deficient LF of Striping) / (Total LF of				
Raised Pavement Markings - 141.06.01	% Deficient (100*Deficient # of Raised Markers / Total # of Raised Markers)				
Pavement Markings - 141.08.01	% Deficient: (100*Deficient # of Markings / Total # of				
Street Lights - 141.09.01	% Malfunctioning: (100*Malfunctioning # of Lights / Total # of Lights)				
Structure & Tunnel Lights - 141.09.02	% Malfunctioning: (100*Malfunctioning # of Lights / Total # of Lights)				
High Mast Lights - 141.09.03	% Malfunctioning: (100*Malfunctioning # of Lights / Total # of Lights)				
Overhead Sign Lighting - 141.09.05	% Malfunctioning: (100*Malfunctioning # of Lights / Total # of Lights)				
Roadway Markers - 141.11.01	% Deficient: (100*Deficient # of Markers/				

<b>Group 134/135 - Maintenance of Roadside Facilities and Appurtenances</b>					
Rock Mulch - 134.03.03	% Deficient: (100*Total Deficient SQFT Rock Mulch)				
Barbed Wire and Fabric Fence - 135.01.01	% Deficient: (100*Deficient LF of Fence /Total LF of Fence)				
Chain Link Fence - 135.01.02	% Deficient: (100*Deficient LF of Fence /Total LF of				
Snow Fence - 135.01.02	% Deficient: (100*Deficient				
Glare Screen and Glare Fence - 135.01.03	% Deficient: (100*Deficient LF of Screen / Total LF of Glare Screen)				
<b>Group 161 - Structure Maintenance</b>					
Bridge/Struc ture Drainage - 161.01.05	% Deficient: (100*Deficient # of Drains/ Total # of Drains)				
Retaining, Sound and Bin Walls - 161.01.07	% Deficient: (100*Deficient SQFT of Walls/ Total SQFT of Walls)				
Bridge/Struc ture Sweeping - 161.02.02	% Deficient Surface Area: (100*SQFT with Dirt and Sand / Total SQFT of Surface Area)				
Graffiti - 161.03.01	Square Feet of Deficiency: (SQFT of Surface Area with				

## APPENDIX B – CONTACTS FOR FIELD SURVEYS

Prior to conducting field surveys, notify the appropriate Sub-District office in the survey area of the planned survey schedule.

<b>Name</b>	<b>Title</b>	<b>Phone</b>	<b>Email</b>
Kevin Porter	MAP Project Manager	775-888-7817	<a href="mailto:kporter@dot.state.nv.us">kporter@dot.state.nv.us</a>

### **DISTRICT 1**

#### **Las Vegas Sub District (1)**

Mohamed Rouas	Assistant District Engineer	702-385-6503	<a href="mailto:mrouas@dot.state.nv.us">mrouas@dot.state.nv.us</a>
James Gutierrez	Maintenance Manager	702-385-6557	<a href="mailto:jgutierrez@dot.state.nv.us">jgutierrez@dot.state.nv.us</a>
Dave Sangster	Maintenance Manager	702-667-4556	<a href="mailto:dsangster@dot.state.nv.us">dsangster@dot.state.nv.us</a>

#### **Tonopah Sub District (5)**

Steve Baer	Assistant District Engineer	775-482-2303	<a href="mailto:sbaer@dot.state.nv.us">sbaer@dot.state.nv.us</a>
Kal Boni	Maintenance Manager	775-482-2377	<a href="mailto:kboni@dot.state.nv.us">kboni@dot.state.nv.us</a>

### **DISTRICT 2**

#### **Reno/Carson City Sub District (2)**

Mike Fuess	Assistant District Engineer	775-834-8333	<a href="mailto:mfuess@dot.state.nv.us">mfuess@dot.state.nv.us</a>
Steve Williams	Maintenance Manager	775-834-8306	<a href="mailto:swilliams@dot.state.nv.us">swilliams@dot.state.nv.us</a>
Brad Burge	Maintenance Manager	775-575-7973	<a href="mailto:bburge@dot.state.nv.us">bburge@dot.state.nv.us</a>

### **DISTRICT 3**

#### **Elko Sub District (3)**

Mike Murphy	Assistant District Engineer	775-777-2712	<a href="mailto:mmurphy@dot.state.nv.us">mmurphy@dot.state.nv.us</a>
Val Nance	Maintenance Manager	775-777-2738	<a href="mailto:vnance@dot.state.nv.us">vnance@dot.state.nv.us</a>

#### **Ely Sub District (4)**

Randy Hesterlee	Assistant District Engineer	775-289-1703	<a href="mailto:rhesterlee@dot.state.nv.us">rhesterlee@dot.state.nv.us</a>
Louie Echegaray	Maintenance Manager	775-289-1704	<a href="mailto:lechegaray@dot.state.nv.us">lechegaray@dot.state.nv.us</a>

#### **Winnemucca Sub District (6)**

Dave Lindeman	Assistant District Engineer	775-623-8012	<a href="mailto:dlindeman@dot.state.nv.us">dlindeman@dot.state.nv.us</a>
Jim Arbonies	Maintenance Manager	775-623-8013	<a href="mailto:jarbonies@dot.state.nv.us">jarbonies@dot.state.nv.us</a>

### **HEADQUARTERS**

Anita Bush	Maintenance and Asset Management Chief	775-888-7856	<a href="mailto:abush@dot.state.nv.us">abush@dot.state.nv.us</a>
Mylinh Lidder	Maintenance and Asset Management Assistant Chief	775-888-7854	<a href="mailto:mlidder@dot.state.nv.us">mlidder@dot.state.nv.us</a>

## APPENDIX C – DISTRICT, SUB-DISTRICT AND COUNTY REFERENCES

### County Codes

CC = CARSON CITY  
CH = CHURCHILL  
CL = CLARK  
DO = DOUGLAS  
EL = ELKO  
ES = ESMERALDA  
EU = EUREKA  
HU = HUMBOLDT  
LA = LANDER  
LI = LINCOLN  
LY = LYON  
MI = MINERAL  
NY = NYE  
PE = PERSHING  
ST = STOREY  
WA = WASHOE  
WH = WHITE PINE

### Districts, Sub-districts and Counties

#### District 1 – Las Vegas

Sub-district 1 - Las Vegas

CL  
LN

Sub-district 5 - Tonopah

ES  
NY

#### District 2 - Reno

Sub-district 2 – Reno/CC

CC  
CH  
DO  
LY  
MI  
PE  
ST  
WA

#### District 3 - Elko

Sub-district 3 - Elko

EL

Sub-district 4 - Ely

EU  
LA  
WP

Sub-district 6 - Winnemucca

HU