INDOT
WORK PERFORMANCE STANDARDS

DIVISION OF MAINTENANCE

July 1, 2013
Revised July 1, 2016

INDIANA DEPARTMENT OF TRANSPORTATION

DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARDS

July 1, 2013
REVISED JULY 1, 2016

Work Performance Standards - List of Revisions

Revision Date	Code	Activity Name	Revision
December 1, 2013	1000	LOANED OUT	Added subactivity for Shop Work
December 1, 2013	2020	DEEP PATCHING	Corrected typo in concrete conversion
December 1, 2013	8125	PANEL SIGN INSPECTION/MAINTENANCE	Revised work method
December 1, 2013	2770	ROADWAY SWEEPING	Typo on PPE section
December 1, 2013	8510	SIGNAL PREVENTIVE MAINTENANCE	Added pedestrian ADA to checklist
December 1, 2013	2991	MAJOR SURFACE/SHOULDER IMPROVEMENTS	Added subactivity for major patching
December 1, 2013	1010	INTERNAL LOANED OUT	Clarified reporting
April 1, 2014	1020 - 1950	LEAVE ACTIVITIES	Added standards to book
April 1, 2014	2230	Herbicide Spot Treatment	Added subactivity for facilities spraying
April 1, 2014	2231	Herbicide Broadcast Treatment	Revised subactivity for invasives
April 1, 2014	2310	MAJOR CLEAN AND RESHAPE DITCHES	Clarified cleaning paved side ditch reporting
April 1, 2014	2311	SPOT DITCHING	Clarified cleaning paved side ditch reporting
April 1, 2014	2320	SMALL CULVERT INSPECTION	Added inspection form
April 1, 2014	2350	SMALL STRUCTURE CLEANING	Clarified cleaning paved side ditch reporting
April 1, 2014	2360	UNDERDRAIN CLEAN/INSPECTION	Revised inspection form
April 1, 2014	2390	OTHER DRAINAGE MAINTEANNCE	Added cleanining paved side ditches to activity
April 1, 2014	2750	FULL WIDTH LITTER PICKUP	Corrected subactivity reference
July 1, 2014	Index	MANMADE AND NATURAL SNOW FENCE	Corrected numbers with name
July 1, 2014	2050	MAINLINE SEAL COAT	Added application rate form.
July 1, 2014	2190	OTHER ROADWAY AND SHOULDER MAINTENANCE	Clarified what types of work are covered
July 1, 2014	2230	HERBICIDE SPOT TREATMENT	Added subactivity
July 1, 2014	2270	SPOT MOWING	Added clarification for mowing vacant lots, added subactivities
July 1, 2014	2291	ROADWAY SLIDE MAINTENANCE	Clarify washouts > 50 tons
July 1, 2014	2390	OTHER DRAINAGE MAINTEANNCE	Carify washouts < 50 tons
July 1, 2014	2490	OTHER BRIDGE MAINTENANCE	Added subactivity for approach repair
July 1, 2014	2610	EMERGENCY MAINTENANCE	Corrected subactivity references in work method
July 1, 2014	2680	MANMADE SNOW FENCE	Added subactivity for removal
July 1, 2014	8340	RAMP OR LOT PAINTING	Added parking lot painting into this activity.
July 1, 2014	8360	SPECIAL MARKING MAINTENANCE	Removed parking lot painting from this activity. Added subactivities for specific material used.
July 1, 2014	8510	SIGNAL PREVENTIVE MAINTENANCE	Added revised QA form
July 1, 2014	8630	UNDERGROUND LOCATION WORK	Clarify report to signal/flasher commission number

Work Performance Standards - List of Revisions (Cont'd)

Revision Date	Code	Activity Name	Revision
January 1, 2015	2050	MAINLINE SEAL COAT	Modified application rate form, revised QA form
January 1, 2015	2241	SPOT SEEDING AND FERTILIZING	Corrected application rates
January 1, 2015	2310/ 2311	MAJOR DITCHING/SPOT DITCHING	Added language requiring material disposal form be attached to WO, revised QA form
January 1, 2015	2360	UNDERDRAIN CLEANING/INSPECTION	Clarified WMS online inspection form only required if followup repairs needed.
January 1, 2015	2451	PERMANENT BRIDGE DECK PATCHING	Revised QA form
January 1, 2015	2550	IMPACT ATTENUATOR/GUARDRAIL END TREATMENT REPAIR	Changed subactivities, added language about maintenance of obsolete units
January 1, 2015	2551	IMPACT ATTENUATOR/GUARDRAIL END TREATMENT INSPECTION	Added inspection form, added language about creating a work request for followup repairs
January 1, 2015	2630	SNOW AND ICE REMOVAL	Clarified comments on WO only required for special/unusual circumstances. Corrected subactivities.
January 1, 2015	8300/ 8320	PAINT CENTERLINES/PAINT EDGELINES	Modified application rate check from first 2 miles to 4, revised QA form
January 1, 2015	8510	SIGNAL PREVENTIVE MAINTENANCE	Clarified MMU changeout cycle
April 1, 2015	2010	PERMANENT SHALLOW PATCHING	Split this activity into "permanent" and "temporary"
April 1, 2015	2011	TEMPORARY SHALLOW PATCHING	Split this activity into "permanent" and "temporary"
April 1, 2015	2050	MAINLINE SEAL COAT	Clarified wording to more closely match specifications, added info on CRS 2P
April 1, 2015	2090	MAINLINE CRACK ROUTE AND SEAL	Revised to align with new Activity 2095
April 1, 2015	2095	RESEALING CONCRETE PAVEMENT JOINTS	New activity for concrete joint sealing.
April 1, 2015	2190	OTHER ROADWAY AND SHOULDER MAINTENANCE	Added subactivities for typical uses of this activity
April 1, 2015	2210	MOWING	Added language to report mowing native vegetation to this activity, added subactivity for this.
April 1, 2015	2220	MANUAL BRUSH CUTTING	Added diagrams to help in measurement of square feet.
April 1, 2015	2221	MECHANICAL BRUSH CUTTING	Added diagrams to help in measurement of square feet.
April 1, 2015	2350	MANUAL DRAIN CLEANING	Split this activity into "manual" and "mechanical" to differentiate simply cleaning leaves vs. utilizing a vac truck
April 1, 2015	2351	MECHANICAL SMALL STRUCTURE CLEANING	Split this activity into "manual" and "mechanical" to differentiate simply cleaning leaves vs. utilizing a vac truck
April 1, 2015	2470	BRIDGE DECK CRACK FILLING	New activity for filling cracks in concrete bridge decks
April 1, 2015	2471	BRIDGE DECK BROADCAST SEALING	New activity for spray sealing concrete bridge decks
April 1, 2015	2690	OTHER WINTER MAINTENANCE	Changed reporting of clearing drains to Activity 2350.
April 1, 2015	8530	SCHEDULED SIGNAL/FLASHER INDICATION REPLACMENT	LED changout cycle has changed from 6 to current policy.
April 1, 2015	8560	SIGNAL/FLASHER EQUIPMENT REPLACEMENT/REPAIR	Added subactivity and work method for overhead inspections.

Work Performance Standards - List of Revisions (Cont'd)

Revision Date	Code	Activity Name	Revision
October 1, 2015	2010	PERMANENT SHALLOW PATCHING	Remove reference to cold mix.
October 1, 2015	2015	MAINLINE FOG SEAL	Updated wording for better clarity.
October 1, 2015	2070	MAINLINE CRACK FILLING	Revise to match new crack treatment guidance.
October 1, 2015	2071	SHOULDER CRACK FILLING	Revise to match new crack treatment guidance.
October 1, 2015	2090	MAINLINE CRACK ROUTE AND SEAL	Revise to match new crack treatment guidance.
October 1, 2015	2091	SHOULDER CRACK ROUTE AND SEAL	Revise to match new crack treatment guidance.
October 1, 2015	2095	RESEALING CONCRETE PAVEMENT JOINTS	Revised diagrams and material requirements.
October 1, 2015	2220	MANUAL BRUSH CUTTING	Added reporting guidance based on new activity for storm debris removal.
October 1, 2015	2551	IMPACT ATTENUATOR/GUARDRAIL END TREATMENT INSPECTION	Added reporting guidance on inspectionform, more detail on end treatment inspections.
October 1, 2015	2610	EMERGENCY MAINTENANCE	Added clarification for purpose and reporting
October 1, 2015	2611	STORM DEBRIS REMOVAL	New activity for removing storm debris from R/W.
October 1, 2015	2760	SPOT LITTER PICK UP	Added reporting guidance based on new activity for storm debris removal.
October 1, 2015	2890	OTHER SUPPORT ACTIVITIES	Corrected subactivity.
October 1, 2015	PREFACE	EQUIPMENT REPORTING	Added guidance on reporting equipment hours. Revised index with new activities.
July 1, 2016	PREFACE	WORK ORDERS	Revised guidance on work order comments. Added section on calling in utility locates.
July 1, 2016	2010	PERMANENT SHALLOW PATCHING	Removed cold mix as a material, added roller to equipment.
July 1, 2016	2020	DEEP PATCHING	Added guidance on calling utility locates.
July 1, 2016	2070	MAINLINE CRACK FILLING	Revised ADP.
July 1, 2016	2090	MAINLINE CRACK ROUT AND SEAL	Revised ADP.
July 1, 2016	2190	OTHER ROADWAY AND SHOULDER MAINTENANCE	Added guidance on calling utility locates.
July 1, 2016	2220	MANUAL BRUSH CUTTING	Added details on reporting when work performed near a bridge.
July 1, 2016	2320	SMALL CULVERT INSPECTION	Added references, details on birds/bats, updated inspection and inventory forms.
July 1, 2016	2336	PIPE LINING - SMALL PIPE	Added guidance on calling utility locates.
July 1, 2016	2337	PIPE LINING - LARGE PIPE	Added guidance on calling utility locates.
July 1, 2016	2390	OTHER DRAINAGE MAINTENANCE	Added guidance on calling utility locates.
July 1, 2016	2410	BRIDGE CLEANING	Revised ADP.
July 1, 2016	2440	BRIDGE FLUSHING	Revised ADP.
July 1, 2016	2550	IMPACT ATTENUATOR/GUARDRAIL END TREATMENT REPAIR	Added guidance that if completely replacing a unit, does not have to be the same brand as existing.

Work Performance Standards - List of Revisions (Cont'd)

Revision Date	Code	Activity Name	Revision
July 1, 2016	2590	OTHER SAFETY DEVICE MAINTENANCE	Took out guidance on marking of control points. That work should be reported to the marking activity.
July 1, 2016	2610	EMERGENCY MAINTENANCE	Corrected typo.
July 1, 2016	7000	SUPPORT WORK ASSIGNMENTS	Added guidance that teambuilding type activities may be reported to this activity.
July 1, 2016	8100	SHEET SIGN MODERNIZATION	Corrected typo.
July 1, 2016	8110	SHEET SIGN MAINTENANCE	Added guidance on calling utility locates. Added direction about NOT installing signs on utility poles.
July 1, 2016	8140	DELINEATION MAINTENANCE PROGRAM	Added guidance on calling utility locates.
July 1, 2016	8300	PAINT CENTERLINE	Added guidance on marking/reporting control points. Revised application rate form.
July 1, 2016	8320	PAINT EDGELINES	Added guidance on marking/reporting control points. Revised application rate form.
July 1, 2016	8510	SIGNAL PREVENTIVE MAINTENANCE	Added guidance on joint railroad inspections for preemption.

Preface

Table of Contents

Introduction

INDOT's maintenance forces perform numerous work activities throughout the state, from pothole patching to signal repairs, by over 100 management units and over 1,000 employees. Consistent work methods and accurate reporting are essential to getting the job done, at the highest quality and lowest cost possible.

The purpose of these work performance standards is to ensure that our maintenance work is done correctly and reported properly. Many of our activities have unit cost goals and quality assurance reviews. By following the work method, the resulting job should meet or exceed the cost and quality goals.

Traffic Control

INDOT's Workzone Traffic Control Handbook should be utilized to plan the traffic control plan for each specific project. Since traffic control varies, traffic control equipment and crew are not shown in the standards, but still need to be planned for and reported into WMS.

The standards only show job-specific equipment and crew necessary to perform the specific work regardless of traffic control.

Safety

INDOT recognizes its responsibility to provide a safe working environment. This should include making reasonable efforts to promptly investigate and address safety issues, not allowing employees to perform unsafe tasks and providing adequate training and safety equipment. All employees are required to use the appropriate personal protective equipment (PPE) per work performance standards.

"Base PPE" in these standards is defined as:

- Approved High Visibility Vest or Shirt
- Approved High Visibility Soft Cap.
- Approved Hard Toe and Hard Soled Work Boots
- Safety Bag inclusive of Hard Hat, Gloves, Hearing Protection and Eye Protection

The performance standards will indicate "Base PPE" for specific activities. Supervisors will be responsible for providing competent review of all safety hazards through the daily safety briefing inclusive of proper use of "Base PPE" and any additional listed specialized PPE. Supervisors will be responsible for ensuring any employee assigned to operate equipment/vehicles listed have been provided adequate training.

Work Orders

Most activities should be considered individual jobs or projects and be recorded on one work order, regardless of how many days it takes to complete the job. For example, a pipe replacement job that takes 3 days (cut pavement day 1, install pipe day 2, patch over cut day 3) shall be 1 work order, not three. Likewise, on a seal coat job all work shall be on one work order, including sign/detour placement, RPM protection, seal coat construction and final sweeping.

Certain activities don't have obvious start and end points (examples include mowing, resigning and restriping). For these types of activities, use a logical timeframe for the work order – if a crew is working in a specific area for the week, that could be a single work order. Depending on the work, duration, and location, the work order could be a single day, week, or pay period.

All work orders, other than overhead activities, are required to have comments. The comments should include details on any special considerations that happened during the job, or specific work performed on an "other" activity. If a question comes up several months after the work is done, the comments should be able to answer it.

Underground Locates

Any work that could result in utility damage must have an underground utility locate submitted at least 2 business days in advance. This includes not only excavation, such as ditching, but also removal or installation of sign or fence posts. See http://indiana811.org/ for more details.

Note that INDOT facilities (such as signal interconnect, lighting wiring, ITS, etc.) are NOT included in 811. Contact your District Traffic section if excavating in the vicinity of INDOT equipment.

Equipment Reporting

All equipment used on a job should be reported on the work order, for the duration of the job, regardless of how long it was actually used. For example, a backhoe used on a pipe replacement (2311) job for an entire 7.5 hour day would be shown on the work order for 7.5 hours, even if it was only operated for 2 hours.

An exception would be if the equipment was on one job, then moved to another. For example, a backhoe was 3 hours on a pipe job, then moved for the rest of the day to a patching job, the pipe work order would show 3 hours, and the patching work order would show 4.5.

Rental equipment needs to be shown on the work order in the same manner, with the actual daily rental fee shown as the cost. If equipment is rented by the month, the daily cost is calculated by dividing the monthly fee by 20. If rented by the week, divide the weekly fee by 5.

Work Performance Standard Template

Each standard contains the following information about the specific activity:

1. **Purpose** – *What the activity is for, and why we are doing it.*

2. **Category** – *Roadway/Drainage, Right-of-Way, Non-Road, or Overhead; and whether the activity is a Preventive Maintenance, has an associated Quality Assurance review, has a Unit Cost Goal, and should be pre-planned locations.*

3. **Scheduling and Coordination** – *Information on when an activity is typically performed considering seasonal, temperature, or other limitations. Also includes other activities to coordinate with.*

4. **Reporting** – *Details on how to report accomplishment, as well as guidance on what should be reported to different activities.*

5. **Reporting Units** – *The units the specific activity is measured in.*

6. **Crew Size** – *Job specific, typical crew size to perform the specific activity. Traffic control personnel are not shown here.*

7. **Job Specific Equipment** – *Job specific, typical equipment to perform the specific activity. Traffic control equipment is not shown here.*

8. **Materials** – *Typical materials for the specific activity, as well as INDOT specification references.*

9. **PPE** – *Specific Personal Protective Equipment for the activity being performed.*

10. **Other References** – *Alternate sources of information relevant to the specific activity. Includes INDOT specification references, policies, handbooks, etc.*

11. **Sub Activities** – *Description of sub activities for the specific activity.*

12. **Work Method** – *Detailed guide on how to perform the specific activity.*

13. **Special Considerations** – *Any other tips for the specific activity.*

Work Performance Standard Index

Overhead, Road Surface, and Right of Way

Code	Activity Name	Measurement Unit	Category
1000	LOANED OUT	MHR - WORK HR	Overhead
1010	INTERNAL LOANED OUT-MODULE TO MODULE	MHR - WORK HR	Overhead
1020	CEMP Plan (MHR - WORK HR)	MHR - WORK HR	Overhead
1030	CEMP Exercise (MHR - WORK HR)	MHR - WORK HR	Non-Road *
1120	FIELD MAINT SUPERVISION	MHR - WORK HR	Non-Road *
1170	TRAINING	MHR - WORK HR	Non-Road *
1200	STANDBY TIME	MHR - WORK HR	Non-Road *
1260	SPECIAL PAID LEAVE - STORM RELIEF	MHR - WORK HR	Overhead
1360	HOLIDAYS	MHR - WORK HR	Overhead
1370	MILITARY LEAVE	MHR - WORK HR	Overhead
1380	JURY DUTY	MHR - WORK HR	Overhead
1390	COMMUNITY SERVICE LEAVE	MHR - WORK HR	Overhead
1490	FUNERAL LEAVE	MHR - WORK HR	Overhead
1580	RADIO OPERATION	MHR - WORK HR	Non-Road *
1740	LEAVE WITHOUT PAY	MHR - WORK HR	Overhead
1760	VOLUNTARY UNPAID LEAVE	MHR - WORK HR	Overhead
1800	SPECIAL SICK LEAVE	MHR - WORK HR	Overhead
1810	OTHER PAID LEAVE	MHR - WORK HR	Overhead
1930	SICK LEAVE	MHR - WORK HR	Overhead
1940	VACATION LEAVE	MHR - WORK HR	Overhead
1950	PERSONAL LEAVE	MHR - WORK HR	Overhead
1970	SUPERVISION OF DOC PERSONNEL	MHR - WORK HR	Overhead
2010	PERMANENT SHALLOW PATCHING	STN - SHORT TON	Roadway & Drainage
2011	TEMPORARY SHALLOW PATCHING	STN - SHORT TON	Roadway & Drainage
2020	DEEP PATCHING	STN - SHORT TON	Roadway & Drainage
2030	SPOT PAVING	STN - SHORT TON	Roadway & Drainage
2040	FULL WIDTH SHOULDER SEAL COAT	FTM - FEET MILE	Roadway & Drainage
2041	SHOULDER FOG SEAL	FTM - FEET MILE	Roadway & Drainage
2050	MAINLINE SEAL COAT	LNM - LANE MILE	Roadway & Drainage
2051	MAINLINE FOG SEAL	LNM - LANE MILE	Roadway & Drainage
2070	MAINLINE CRACK FILLING	LNM - LANE MILE	Roadway & Drainage
2071	SHOULDER CRACK FILLING	FTM - FEET MILE	Roadway & Drainage
2090	MAINLINE CRACK ROUTE AND SEAL	LNM - LANE MILE	Roadway & Drainage
2091	SHOULDER CRACK ROUTE AND SEAL	FTM - FEET MILE	Roadway & Drainage
2095	RESEALING CONCRETE PAVEMENT JOINTS	LNM - LANE MILE	Roadway & Drainage
2100	SPOT REPAIR OF UNPAVED SHOULDERS	STN - SHORT TON	Roadway & Drainage
2110	BLADING SHOULDERS	SHM - SHLDR MI	Roadway & Drainage
2120	CLIPPING SHOULDERS	SHM - SHLDR MI	Roadway & Drainage
2130	RECONDITION SHOULDERS	SHM - SHLDR MI	Roadway & Drainage
2140	JOINT & BUMP REPAIR	BMP - BUMPS	Roadway & Drainage
2190	OTHER RDWAY/SHLDR	MHR - WORK HR	Roadway & Drainage

*Continuation of **Overhead, Road Surface, and Right of Way** on Next page*

Work Performance Standard Index

Overhead, Road Surface, and Right of Way *(Cont.d)*

Code	Activity Name	Measurement Unit	Category
2210	MOWING	SWATH MILE	Right of Way
2220	MANUAL BRUSH CUTTING	SQF - SQUARE FT	Right of Way
2221	MECHANICAL BRUSH CUTTING	SQF - SQUARE FT	Right of Way
2230	HERBICIDE SPOT TREATMENT	ACR - ACRE	Right of Way
2231	HERBICIDE BROADCASTING	ACR - ACRE	Right of Way
2232	LAWN AND LANDSCAPING	ACR - ACRE	Right of Way
2240	SEEDING AND FERTILIZING	ACR - ACRE	Right of Way
2241	SPOT SEEDING/FERTILIZING	SQF - SQUARE FT	Right of Way
2250	TRIM TREE	TRE - TREES	Right of Way
2251	TREE REMOVAL	TRE - TREES	Right of Way
2260	STUMP REMOVAL	STM - STUMPS	Right of Way
2270	SPOT MOWING	SQF - SQUARE FT	Right of Way
2280	RIGHT OF WAY FENCE	LF - LIN FOOT	Right of Way
2290	OTHER ROADSIDE MAINT	MHR - WORK HR	Right of Way
2291	ROADWAY SLIDE MAINT	MHR - WORK HR	Roadway & Drainage

Work Performance Standard Index

Drainage, Bridges, Safety Appurtenances, Snow and Ice, and Support

Code	Activity Name	Measurement Unit	Category
2310	MAJOR CLEAN/RESHAPE DITCH	LF - LIN FOOT	Roadway & Drainage
2311	SPOT DITCHING	LOC - LOCATIONS	Roadway & Drainage
2320	SMALL CULVERT INSPECTION	STR - STRUCTURE	Roadway & Drainage
2331	CULVERT REPLACEMENT - SMALL PIPE (≤36")	LF - LIN FOOT	Roadway & Drainage
2332	CULVERT REPLACEMENT - LARGE PIPE (>36")	LF - LIN FOOT	Roadway & Drainage
2336	PIPE LINING - SMALL PIPE (≤36")	LF - LIN FOOT	Roadway & Drainage
2337	PIPE LINING - LARGE PIPE (>36")	LF - LIN FOOT	Roadway & Drainage
2350	MANUAL DRAIN CLEANING	DRN - DRAINS	Roadway & Drainage
2351	MECHANICAL SMALL STRUCTURE CLEANING	STR - STRUCTURE	Roadway & Drainage
2360	UNDERDRAIN CLEANING AND INSPECTION	STR - STRUCTURE	Roadway & Drainage
2390	OTHER DRAINAGE MAINTENANCE	MHR - WORK HR	Roadway & Drainage
2410	BRIDGE CLEANING	BRG - BRIDGES	Roadway & Drainage
2440	BRIDGE FLUSHING	BRG - BRIDGES	Roadway & Drainage
2450	TEMPORARY BRIDGE DECK PATCHING	SQF - SQUARE FT	Roadway & Drainage
2451	PERMANENT BRIDGE DECK PATCHING	SQF - SQUARE FT	Roadway & Drainage
2470	BRIDGE DECK CRACK FILLING	SQF - SQUARE FT	Roadway & Drainage
2471	BRIDGE DECK BROADCAST SEALING	SQF - SQUARE FT	Roadway & Drainage
2490	OTHER BRIDGE MAINTENANCE	MHR - WORK HR	Roadway & Drainage
2510	NOISE WALL REPAIR	MHR - WORK HR	Right of Way
2530	CABLE BARRIER REPAIR	LF - LIN FOOT	Roadway & Drainage
2550	IMPACT ATTENUATOR/GUARDRAIL END TREATMENT REPAIR	UNT - UNITS	Roadway & Drainage
2551	IMPACT ATTENUATOR/GUARDRAIL END TREATMENT INSPECTION	UNT - UNITS	Roadway & Drainage
2560	RPM CASTING INSP REM	RPM - RPM MILES	Roadway & Drainage
2580	GUARDRAIL MAINTENANCE	LF - LIN FOOT	Roadway & Drainage
2590	OTHER SAFETY DEVICE MAINTENANCE	MHR - WORK HR	Non-Road *
2610	EMERGENCY MAINTENANCE	MHR - WORK HR	Roadway & Drainage
2611	STORM DEBRIS REMOVAL	CY - CUBIC YARDS	Roadway & Drainage
2630	SNOW & ICE REMOVAL	MIL - MILES	Roadway & Drainage
2640	BRINE MIXING	GAL - GALLON (US LIQ)	Non-Road *
2650	STOCKPILING WINTER MATERIAL	MHR - WORK HR	Non-Road *
2660	PATROLLING	MIL - MILES	Roadway & Drainage
2670	NATURAL SNOW FENCE	ACR-ACRE	Right of Way
2680	MAN MADE SNOW FENCE	FT - FEET	Right of Way
2690	OTHER WINTER MAINTENANCE	MHR - WORK HR	Non-Road *
2710	LIFT BRIDGE ATTENDANT	MHR - WORK HR	Roadway & Drainage
2720	REST PARK AND WEIGH STATION MAINTENANCE	MHR - WORK HR	Roadway & Drainage
2750	FULL WIDTH LITTER PU	CY - CUBIC YARDS	Right of Way
2760	SPOT LITTER PICKUP	CY - CUBIC YARDS	Right of Way
2770	ROADWAY SWEEPING	LMI - LINEAR MILES	Roadway & Drainage
2790	OTHER SERVICE ACTIVITIES	MHR - WORK HR	Non-Road *
2791	TRAFFIC CONTROL SUPPORT	MHR - WORK HR	Roadway & Drainage
2810	EQUIPMENT SERVICING	MHR - WORK HR	Non-Road *
2830	BLDG & GRND MAINT	MHR - WORK HR	Non-Road *
2840	MATRLS HNDLNG/STORNG	MHR - WORK HR	Non-Road *
2890	OTHER SUPPORT ACTIVITIES	MHR - WORK HR	Non-Road *
2991	SURFACE & SHOULDER REPAIR	MHR - WORK HR	Roadway & Drainage
7000	SUPPORT WORK ASSIGNMENTS	MHR - WORK HR	Non-Road *

Work Performance Standard Index

Traffic

Code	Activity Name	Measurement Unit	Category
8100	SHEET SIGN MODERNIZATION	SGN - SIGNS	Roadway & Drainage
8110	SHEET SIGN MAINTENANCE	SGN - SIGNS	Roadway & Drainage
8120	PANEL SIGN MAINTENANCE	SGN - SIGNS	Roadway & Drainage
8121	PANEL SIGN OVERLAY	SF - SQ	Roadway & Drainage
8125	PANEL SIGN INSPECTION/MINOR MAINT	SGN - SIGNS	Roadway & Drainage
8140	DELINEATION MAINTENANCE PROGRAM	DLN - DELINEATOR	Roadway & Drainage
8150	DETOUR WORK	MHR - WORK HR	Roadway & Drainage
8200	TRAFFIC SIGN WORK ORDERS	SGN - SIGNS	Roadway & Drainage
8300	PAINT CENTERLINES	PTM - PAINT MI	Roadway & Drainage
8320	PAINT EDGELINES	PTM - PAINT MI	Roadway & Drainage
8340	RAMP PAINTING	PTM - PAINT MI	Roadway & Drainage
8350	CURB PAINTING	LF - LIN FOOT	Roadway & Drainage
8360	SPECIAL MARKING MAINTENANCE	SQF - SQUARE FT	Roadway & Drainage
8390	INSPECT/REPLACE REFLECTORS	EA - EACH	Roadway & Drainage
8400	NEW SPECIAL MARKING INSTALLATION	SF - SQ	Roadway & Drainage
8500	SIGNAL MAINTENANCE RESPONSE	S/F - SIGNAL / FLASHER	Roadway & Drainage
8510	SIGNAL PREVENTIVE MAINTENANCE	SIG - SIGNAL	Roadway & Drainage
8511	FLASHER PREVENTATIVE MAINTENANCE	FLA - FLASHER	Roadway & Drainage
8520	SIGNAL SHOP ACTIVITIES	MHR - WORK HR	Non-Road *
8530	SCHEDULED SIG/FLASH INDICATION REPLACEMENT	INDICATIONS	Roadway & Drainage
8535	NON SCHEDULED SIGNAL/FLASHER INDICATION REPLACEMENT	INDICATIONS	Roadway & Drainage
8541	DETECTOR LOOP SPLICE REPAIR/INSTALL	SPS- SPLICES	Roadway & Drainage
8550	NEW SIGNAL/FLASHER INSPECTION OR TURN ON	S/F - SIGNAL / FLASHER	Roadway & Drainage
8551	NEW LIGHTING INSPECTION	STR - STRUCTURE	Roadway & Drainage
8560	SIGNAL/FLASHER EQUIPMENT REPLACEMENT/REPAIR	S/F - SIGNAL / FLASHER	Roadway & Drainage
8570	SIGNAL/FLASHER EQUIPMENT UPGRADE	S/F - SIGNAL / FLASHER	Roadway & Drainage
8590	SIGNAL/FLASHER INSTALLATION/REMOVAL	S/F - SIGNAL / FLASHER	Roadway & Drainage
8610	LIGHTING SURVEILLANCE	FIX - FIXTURE	Non-Road *
8620	LIGHTING REPAIRS/REPLACEMENTS	FIX - FIXTURE	Roadway & Drainage
8621	SCHEDULED LIGHTING BULB CHANGE	FIX - FIXTURE	Roadway & Drainage
8630	UNDERGROUND LOCATION WORK	MHR - WORK HR	Non-Road *
8920	GATHER FIELD DATA	MHR - WORK HR	Non-Road *
9000	DISABILITY / WORKMANS COMP LEAVE	MHR - WORK HR	Overhead

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Loaned Out	CODE	1000

Purpose

Report person hours of Maintenance and Traffic personnel assigned to work that is not reported in WMS (i.e. Construction and Testing) to this loaned out activity.

Category Overhead

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Dates and number of loaned personnel are provided by the District and are to be incorporated into the schedule.

*For long term assignments outside WMS, remove those employees from the FTE count.

Reporting | **Reporting Units** Person Hours

Time must be entered into PeopleSoft directly. *For work performed in another WMS module (Facilities, Traffic, etc.) report to 1010 - Internal Loaned Out.

Crew Size | **Workers**

QTY

P.P.E.

Materials

Job Specific Equipment

Other References

Sub Activities

230 - Construction

231 - Testing

232 - Shop

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Loaned Out	CODE	1000

Work Method

Includes assisting with District non-Operations activities.

Special Considerations

For long term assignments, remove from FTE total.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Internal Loaned Out - Module to Module (within the Work Management System)	CODE	1010

Purpose

Report the person hours of planned Maintenance and Traffic personnel assigned to work in a WMS module other than where they were planned. (i.e. Roadway to Facilities or Signal to Roadway, etc.)

Category Overhead

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Include known projects in the annual plan when personnel will work with other WMS module personnel; not all Internal Loaned Out will be included in the plan due to unscheduled requests.

Reporting

Reporting Units Person Hours

This activity is not passed in the Time and Labor interface. The employee must be on a work order in the module in which they are working for this reason.

Crew Size

Workers

QTY

P.P.E.

Materials

Job Specific Equipment

Other References

Sub Activities

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Internal Loaned Out - Module to Module (within the Work Management System)	CODE	1010

Work Method

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	Comprehensive Emergency Management Plan	CODE	1020

Purpose

Capture all person hours responding to or assisting with an actual emergency event where no specific WMS activity applies to the work being performed.

Category Overhead

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

Scheduling & Coordination

Reporting

Report person hours of all personnel responding to or assisting during an emergency event where no established standard-activity exists. Examples of this may be bridge or structure inspections, assisting with WMS entry, manning the on-site command center, etc.

Crew Size — **Worker(s)** — QTY

P.P.E.

Materials

Job Specific Equipment

Other References

Sub Activities

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	Comprehensive Emergency Management Plan	CODE	1020

Work Method

Special Considerations

Paper work orders should be completed to record the actual work activities performed, all resources utilized, exact location of the work, and incident information for the actual event. The event lead will establish the location to turn in the completed paper WO and any additional requirements.

**Copies of the paper work order form will be available at the onsite command center trailer or from the individual in charge of the work location.*

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	CEMP Exercise	CODE	1030

Purpose

Report person hours of all personnel assigned to assist with a planned emergency training exercise.

Category Overhead

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

Scheduling & Coordination

Reporting

Record the number of hours worked by all personnel (including maintenance and traffic employees).

Crew Size — **Worker(s)** — QTY

P.P.E.

Materials

Job Specific Equipment

Other References

Sub Activities

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	CEMP Exercise	CODE	1030

Work Method

Special Considerations

Paper work orders should be completed to record the actual work activities performed, all resources utilized, exact location of the work, and incident information for the training event/exercise. The event lead will establish the location to turn in the completed paper WO and any additional requirements.

**Copies of the paper work order form will be available at the onsite command center trailer or from the individual in charge of the work location.*

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Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Field Maintenance Supervision	CODE	1120

Purpose

The supervision and coordination of routine highway maintenance activities by personnel not normally in a supervisory role, i.e. when a Crew Leader fills in for a Unit Foreman while the Unit Foreman is on leave.

Category Non-Road

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule and perform this activity as required to ensure adequate supervision and coordination of maintenance activities.

Reporting

Reporting Units Person Hours

This activity should only be used when performing supervisory functions. When working as part of the crew, the acting Unit Foreman should report to that specific work order as well i.e.hours spent as acting Unit Foreman would be reported to this activity with the remainder of the hours spent as part of the crew reported to the specific work activity.

Crew Size

Workers

QTY

P.P.E.

Materials

Job Specific Equipment

Other References

Sub Activities

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Field Maintenance Supervision	CODE	1120

Work Method

1. Note deficiencies and work with crews to improve performance.
2. Make sure that assigend activities are being performed.
3. Inspect finished work performed by crews.
4. Inspect road system; noting defects requiring corrective action.
5. Make sure that daily reports are completed correctly.

Special Considerations

		APPROVED BY	
		Director, Highway Maintenance	
Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Training	CODE	1170

Purpose

Report time spent by Maintenance and Traffic personnel participating in training sessions and safety trainings. Includes the training on snow removal routes and equipment prior to the winter season.

Category Non-Road

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

Scheduling & Coordination

Schedule training sessions for personnel as training is available or required. During down time, utilization of training sessions and training materials should be emphasized.

Reporting

Reporting Units Person Hours

Crew Size

Workers	QTY

P.P.E.

Materials

Job Specific Equipment

Other References

Sub Activities

120 - HT Training
125 - CDL Training
627 - Safety
851 - Snow & Ice Training
915 - Roadeo
950 - EOP Emergency Operation Plan
955 - DOC Supervision Training

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Training	CODE	1170

Work Method

1. Determine training needs.
2. Become familiar with content.
3. Perform/attend training.
4. Record and report all participants.
5. Return training material to clean, safe storage.

Special Considerations

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Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Standby Time	CODE	1200

Purpose

If work is delayed 1 to 2 hours, standby time is used to report work delays due to weather conditions, equipment breakdowns, or other situations prohibiting productive work.

Category Non-Road

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

Scheduling & Coordination

With good planning and attention to weather reports, this activity should rarely be used.

Reporting | **Reporting Units** Person Hours

Accomplishment is the total person hours.

Report time to this activity only when it's not possible to perform scheduled work activities.

If total down time is less than 1 hour, do not use this activity - keep time on the specific work activity. Do not report more than 2 hours of down time - reassign crew to another activity.

For example, a 5 person crew with a rain delay from 10:00AM to 12:00PM would report a total of 10 person hours accomplishment. There is more than 1 hour but no more than 2 hours (per crew member) of non-productive time spent.

Crew Size | **Workers**

QTY

P.P.E.

Materials

Job Specific Equipment

Other References

Sub Activities

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Standby Time	CODE	1200

Work Method

1. Determine expected length of work delay.
2. If determined to be two (2) hours or more, re-assign crew to a different activity.
3. If less than one (1) hour, leave time on the specific work activity.

Special Considerations

Use only when one (1) to two (2) hours are spent that cannot be associated to another work activity.

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Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	Holidays	CODE	1360

Purpose

Report person hours for paid holiday time.

*To view the complete and most current policy and procedure guideline, see **"Other References"** below.*

Category Overhead

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

Scheduling & Coordination

Legal holidays include: New Year's Day, Martin Luther King, Jr. Day, Lincoln's Birthday (Observed with/in addition to Thanksgiving Day), Washington's Birthday (Observed with/in addition to Christmas Day), Good Friday, Primary Election Day, Memorial Day, Independence Day, Labor Day, Columbus Day, General Election Day, Veterans Day, Thanksgiving Day, and Christmas Day

Reporting

Time reported for each employee for each holiday should not exceed 7.5 hours.

Crew Size | **Worker(s)**

QTY

P.P.E.

N/A

Materials

Job Specific Equipment

Other References

http://www.in.gov/spd/files/holpol.pdf

http://www.in.gov/spd/files/holrandp.pdf

http://www.in.gov/spd/files/Leaves_of_Absence.pdf

For a complete listing of all Indiana State Personnel Department Standardized Policies:

http://www.in.gov/spd/2396.htm

Sub Activities

104 – Holiday

105 – Holiday FMLA

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	Holidays	CODE	1360

Work Method

Special Considerations

Employees are eligible to receive compensation for holidays in the following circumstances:

- Employee is full-time, part-time, or hourly occupying a permanent position; and
- Employee is in pay status during the calendar week in which the holiday is observed; however,
- Employees are not eligible to receive compensation for holidays observed prior to the first work day of employment or after the last work day of employment.

A full-time, part-time, or permanent positioned employee is required to work on a date that a holiday is observed for his/her assigned operation, the employee is entitled to appropriate payment for such hours worked and, in addition, may choose to have the holiday compensation with the regular compensation for that pay period or may choose compensatory time off to be used on another date. Temporary and intermittent employees who are required to work on an observed holiday will receive the appropriate compensation for the hours worked, but are not entitled to any additional compensation under this policy.

The Governor will annually set the dates of observance for legal holidays which will be communicated prior to the start of the calendar year.

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Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	Military Leave	CODE	1370

Purpose

Report person hours for paid military leave.

*To view the complete and most current policy and procedure guideline, see **"Other References"** below.*

Category Overhead

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

Scheduling & Coordination

Employees who are members of the Armed Forces Reserves or the Indiana National Guard are entitled to not more than fifteen (15) calendar days paid military leave in each calendar year in which military service is performed, without loss of pay or vacation time. Leave(s) will be granted in accordance with any orders for military duty.

Reporting

Time reported for each employee for each day of military leave should not exceed employee's daily scheduled hours, and not to exceed a total of 112.5 hours in a calendar year.

Crew Size — **Worker(s)**

QTY

P.P.E.

N/A

Materials

Job Specific Equipment

Other References

http://www.in.gov/spd/files/militarypol.pdf

http://www.in.gov/spd/files/militaryrandp.pdf

http://www.in.gov/spd/files/Leaves_of_Absence.pdf

For a complete listing of all Indiana State Personnel Department Standardized Policies:

http://www.in.gov/spd/2396.htm

Sub Activities

107 – Military Leave

108 – Military Leave Unpaid

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	Military Leave	CODE	1370

Work Method

Special Considerations

Active Military Service means state active duty service, federally funded state active service, or federal active service, but excludes service performed exclusively for training, including basic combat training, advanced individual training, annual training, inactive duty training, and special training periodically made available to reserve members.

If the military leave continues into the next calendar year, the employee may be eligible for an additional fifteen (15) days of military leave without loss of pay.

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Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	Jury Duty	CODE	1380

Purpose

Report person hours for paid jury duty.

*To view the complete and most current policy and procedure guideline, see **"Other References"** below.*

Category Overhead

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

Scheduling & Coordination

Reporting

Time reported for each employee for each day of jury duty (or witness in a court proceeding) should not exceed employees daily scheduled hours. *Approved length of paid time will be that stated within the official court document requesting the employee's appearance.

Crew Size | **Worker(s)**

QTY

P.P.E.

N/A

Materials

Job Specific Equipment

Other References

http://www.in.gov/spd/files/Leaves_of_Absence.pdf

For a complete listing of all Indiana State Personnel Department Standardized Policies:

http://www.in.gov/spd/2396.htm

Sub Activities

106 – Jury Duty

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	Jury Duty	CODE	1380

Work Method

Special Considerations

Paid jury duty leave to be used when presence for jury trial or witness in a court proceeding is stated with an official court document.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	Community Service Leave	CODE	1390

Purpose

Report person hours for paid community service leave.

*To view the complete and most current policy and procedure guideline, see **"Other References"** below.*

Category Overhead

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

Scheduling & Coordination

Reporting

Time reported for each employee for community service leave should not exceed 7.5 hours in a calendar year.

Crew Size

Worker(s)	QTY

P.P.E.

N/A

Materials

Job Specific Equipment

Other References

http://www.in.gov/spd/files/comservpol.pdf

http://www.in.gov/spd/files/comservrandp.pdf

http://www.in.gov/spd/files/Leaves_of_Absence.pdf

For a complete listing of all Indiana State Personnel Department Standardized Policies:

http://www.in.gov/spd/2396.htm

Sub Activities

103 – Community Service

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

PERFORMANCE STANDARD

ACTIVITY	Community Service Leave	CODE	1390

Work Method

Special Considerations

Each full time State employee who shows that s/he has volunteered his/her own time to a charitable organization will be allowed leave with pay from the employee's regular assigned duties, not to exceed a combined total of seven and one-half hours (7.5) each calendar year.

A Request for Leave form must be submitted seven (7) calendar days in advance unless in an emergency situation. This form can be found on Page 2 of the Community Service Leave Responsibilities & Procedures document (also referenced above):

http://www.in.gov/spd/files/comservrandp.pdf

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	Funeral Leave	CODE	1490

Purpose

Report person hours for paid funeral leave.

*To view the complete and most current policy and procedure guideline, see **"Other References"** below.*

Category Overhead

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

Scheduling & Coordination

Reporting

Time reported for each employee for each day of funeral leave should not exceed employees daily scheduled hours and not to exceed three (3) consecutive scheduled work days per qualifying event.

Crew Size

Worker(s)	QTY

P.P.E.

N/A

Materials

Job Specific Equipment

Other References

http://www.in.gov/spd/files/funeralpol.pdf

http://www.in.gov/spd/files/funeralrandp.pdf

http://www.in.gov/spd/files/Leaves_of_Absence.pdf

For a complete listing of all Indiana State Personnel Department Standardized Policies:

http://www.in.gov/spd/2396.htm

Sub Activities

117 – Funeral Leave

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	Funeral Leave	CODE	1490

Work Method

Special Considerations

Funeral leave will be granted in the event of a relatives death – relative being described as a husband, wife, father, mother, son, daughter, brother, sister, grandparent (including greats), grandchild (including greats), or spouse of any of these, or a person living in the same household with the employee. For a married employee, these members of the spouse's family are included.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Radio Operation	CODE	1580

Purpose

Operation of base station radio equipment to provide communication between field units for the coordination of routine and emergency maintenance work.

Category Non-Road

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Typically performed during winter storm or other significant weather events.

Reporting | **Reporting Units** Person Hours

Report hours of radio operation, performed by all personnel transferred from other divisions to Maintenance for the winter season, including all office and garage personnel.

Crew Size | **Workers**

QTY

P.P.E.

Materials

Job Specific Equipment

Other References

Sub Activities

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Radio Operation	CODE	1580

Work Method

Special Considerations

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Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	Leave Without Pay	CODE	1740

Purpose

Report person hours for leave without pay.

*To view the complete and most current policy and procedure guideline, see **"Other References"** below.*

Category Overhead

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

Scheduling & Coordination

Reporting

Time reported for each employee for each day of leave without pay should not exceed employees daily scheduled hours.

Crew Size

Worker(s)	QTY

P.P.E.

N/A

Materials

Job Specific Equipment

Other References

http://www.in.gov/spd/files/Leaves_of_Absence.pdf

For a complete listing of all Indiana State Personnel Department Standardized Policies:

http://www.in.gov/spd/2396.htm

Sub Activities

100 – Authorized Leave Without Pay

101 – Leave Without Pay / FMLA

102 – Unauthorized Leave Without Pay

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	Leave Without Pay	CODE	1740

Work Method

Special Considerations

Please refer to the SPD Policy and Procedure document referenced in “Other References” above for specific information on each type of other paid leave.

APPROVED BY

Director, ~~Highway~~ Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	Special Sick Leave	CODE	1800

Purpose

Report person hours for paid special sick leave.

*To view the complete and most current policy and procedure guideline, see **"Other References"** below.*

Category — Overhead

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

Scheduling & Coordination

Reporting

Time reported should not exceed the employee's documented and eligible paid special sick leave balance.

Crew Size — **Worker(s)**

QTY

P.P.E.

N/A

Materials

Job Specific Equipment

Other References

http://www.in.gov/spd/files/Leaves_of_Absence.pdf

For a complete listing of all Indiana State Personnel Department Standardized Policies:

http://www.in.gov/spd/2396.htm

Sub Activities

113 – Special Sick Leave

114 – Special Sick FMLA

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	Special Sick Leave	CODE	1800

Work Method

Special Considerations

Documentation for Special Sick Leave will show that the employee had accrued the leave prior to July 1, 1989, and has not previously used the entire accrual or broken service. It must also show that the employee has exhausted all accrued sick, vacation, and personal leave.

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Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	Other Paid Leave	CODE	1810

Purpose

Report person hours for other paid leave.

*To view the complete and most current policy and procedure guideline, see **"Other References"** below.*

Category Overhead

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

Scheduling & Coordination

Reporting

Time reported for each employee for each day of other paid leave should not exceed employees daily scheduled hours. *See specific leave type for maximum allowances.

Crew Size

Worker(s)	QTY

P.P.E.

N/A

Materials

Job Specific Equipment

Other References

http://www.in.gov/spd/files/Leaves_of_Absence.pdf

For a complete listing of all Indiana State Personnel Department Standardized Policies:

http://www.in.gov/spd/2396.htm

Sub Activities

119 – Other Paid Leave

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

PERFORMANCE STANDARD

ACTIVITY	Other Paid Leave	CODE	1810

Work Method

Special Considerations

Please refer to the SPD Policy and Procedure document referenced in “Other References” above for specific information on each type of other paid leave.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	Sick Leave	CODE	1930

Purpose

Report person hours for paid sick leave.

*To view the complete and most current policy and procedure guideline, see **"Other References"** below.*

Category — Overhead

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

Scheduling & Coordination

Request for sick leave shall be submitted to appropriate person within fifteen (15) minutes prior to the start of shift or assigned work hours. For employees in seven (7) day, twenty-four (24) hour operations, notice shall be required one (1) hour prior to start of shift or assigned work hours.

Reporting

Time reported should not exceed the employee's documented and eligible paid sick leave balance.

Crew Size — **Worker(s)**

QTY

P.P.E.

N/A

Materials

Job Specific Equipment

Other References

http://www.in.gov/spd/files/sickpol.pdf

http://www.in.gov/spd/files/sickrandp.pdf

http://www.in.gov/spd/files/Leaves_of_Absence.pdf

For a complete listing of all Indiana State Personnel Department Standardized Policies:

http://www.in.gov/spd/2396.htm

Sub Activities

111 – Sick Time

112 – Sick Time Used w/FMLA

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	Sick Leave	CODE	1930

Work Method

Special Considerations

Eligible employees may use accumulated sick leave for an illness, injury, legal quarantine or visits to a licensed health care provider, for themselves or a member of the employee's immediate family or person residing in the employee's household who is dependent upon the employee for care, which necessitates the employee's absence from work.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	Vacation Leave	CODE	1940

Purpose

Report person hours for paid vacation leave.

*To view the complete and most current policy and procedure guideline, see **"Other References"** below.*

Category — Overhead

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

Scheduling & Coordination

Requests for vacation leave shall be submitted to appropriate person no later than the close of the employee's shift or assigned work hours on the day before the requested vacation leave is to be taken.

Reporting

Time reported should not exceed the employee's documented and eligible paid vacation leave balance.

Crew Size — **Worker(s)**

QTY

P.P.E.

N/A

Materials

Job Specific Equipment

Other References

http://www.in.gov/spd/files/vacationpol.pdf

http://www.in.gov/spd/files/vacationrandp.pdf

http://www.in.gov/spd/files/Leaves_of_Absence.pdf

For a complete listing of all Indiana State Personnel Department Standardized Policies:

http://www.in.gov/spd/2396.htm

Sub Activities

115 – Vacation

116 – Vacation Time Used w/FMLA

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	Vacation Leave	CODE	1940

Work Method

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	Personal Leave	CODE	1950

Purpose

Report person hours for paid personal leave.

*To view the complete and most current policy and procedure guideline, see **"Other References"** below.*

Category Overhead

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

Scheduling & Coordination

Requests for personal leave shall be submitted to appropriate person within fifteen (15) minutes prior to the start of assigned work hours. For employees in seven (7) day, twenty-four (24) hour operations, notice shall be required one (1) hour prior to start of assigned work hours.

Reporting

Time reported should not exceed the employee's documented and eligible paid personal leave balance.

Crew Size — **Worker(s)**

QTY

P.P.E.

N/A

Materials

Job Specific Equipment

Other References

http://www.in.gov/spd/files/personpol.pdf

http://www.in.gov/spd/files/personrandp.pdf

http://www.in.gov/spd/files/Leaves_of_Absence.pdf

For a complete listing of all Indiana State Personnel Department Standardized Policies:

http://www.in.gov/spd/2396.htm

Sub Activities

109 – Personal Time

110 – Personal Used w/FMLA

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	Personal Leave	CODE	1950

Work Method

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Permanent Shallow Patching	CODE	2010

Purpose

Permanent repair of minor patching of small areas of bituminous roadway or shoulder surface, where the depth of the patch is not greater than the thickness of the pavement. Patching should be completed with hot mix asphalt or asphalt emulsion and aggregate to correct potholes, edge failures, and other potential surface hazards to delay further deterioration of the surface.

Category Roadway/Drainage

- ☐ **PM**
- ☒ **QA**
- ☒ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Repair surface failures exceeding 1" in depth and 1' in diameter as soon as possible after they are reported. Other surface failures, which do not present a hazard to traffic, should be scheduled as routine maintenance prior to the beginning of inclement weather, which is typically November 1st.

Reporting **Reporting Units** Short Tons

Accomplishment is reported in STN – Short Tons.

STN (Short Tons) is equal to 2,000 lbs.

Accomplishment should be reported as the total of all material quantities (HMA, asphalt emulsion, etc.) added together.

This activity is for permanent patching of the roadway which requires additional work such as squaring the patch area and the use of asphalt emulsion for a tack coat.

If the distressed area is simply patched with material and compacted, it should be reported to Activity 2011 – Temporary Shallow Patching.

If the sub-grade is removed and replaced during the patch, it should be reported to Activity 2020 – Deep Patching.

Crew Size **4 - 6 Workers**

	QTY
Truck Driver/Laborer	2
Laborer	2 – 4

Note: Traffic Control Personnel are NOT shown here

Job Specific Equipment

	QTY
Asphalt Storage Trailer	1
Compactor/Roller	1
Skid Loader/Grinder	1
Hand Tools (See Special Considerations)	1
Spray Injection Patcher (Durapatcher)	1

Note: Traffic Control Equipment is NOT shown here

P.P.E.

1) Base P.P.E.

Materials

HMA Surface – Type B (STN – Short Ton)
INDOT Spec Section 902.01 (a)

Aggregate (STN – Short Ton)
INDOT Spec Section 904

Asphalt Emulsion (STN – Short Ton)
INDOT Spec Section 902.01 (b)

Other References

Sub Activities

Average Daily Production	4 STN – Short Tons	EFFECTIVE DATE	July 1, 2016

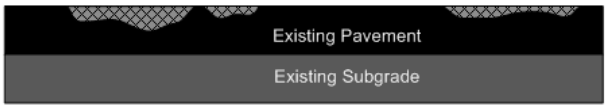
ACTIVITY	Permanent Shallow Patching	CODE	2010

Work Method

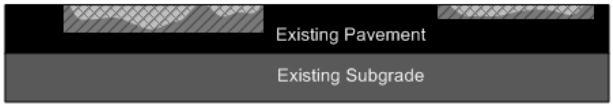
1. Place signs and safety devices.

Using an Asphalt Storage Trailer

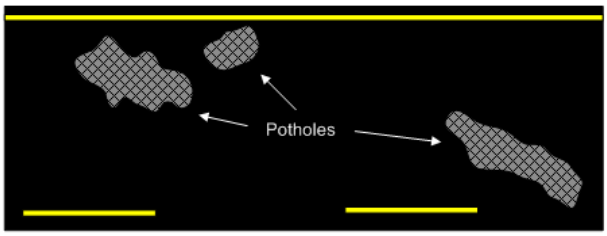
2. Use a pavement saw, grinder or jackhammer to cut a rectangular outline of the patch area.



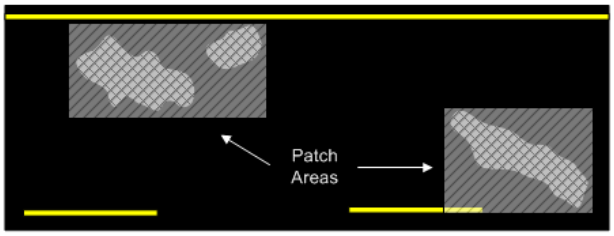
Elevation View



Elevation View

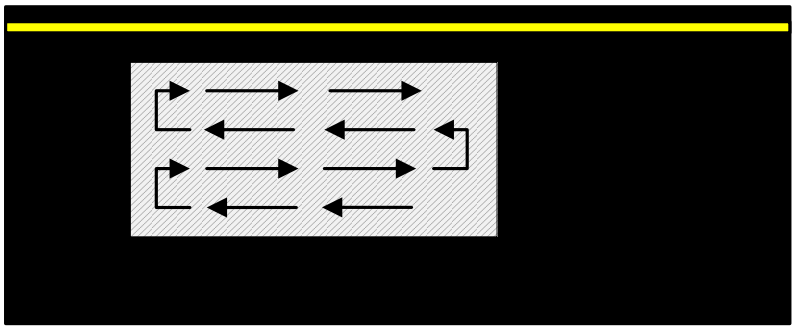


Plan View



Plan View

3. Remove all old material from the patch area.
4. Tack both the bottom and the sides of the patch area with asphalt emulsion.
5. Place asphalt in the patch in appropriate lifts.
   - For intermediate asphalt, 2 – 4 inches per lift
   - For surface asphalt, 1 – 2 inches per lift
6. Compact each lift with a roller or vibratory compactor for large patches or a hand tamper for small patches.
7. On the final lift, lute the top of the patch slightly higher than the surrounding pavement before compacting it.
8. When compacting, roll and vibrate (if possible) the asphalt longitudinally with the lane starting at high side and working toward the low side with overlapping passes.



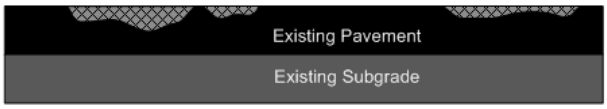
9. The surface should be flush to within ¼" higher than the original pavement after compaction.
10. Remove all signs and safety devices.

ACTIVITY	Permanent Shallow Patching	CODE	2010

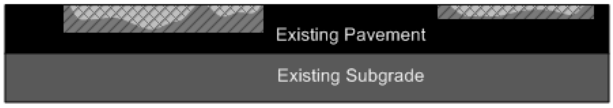
Work Method (continued)

Using a Spray Injection Patcher

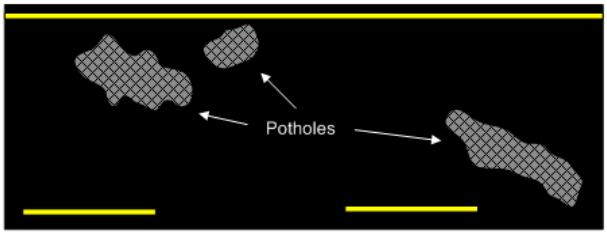
2. Use a pavement saw, grinder or jackhammer to cut a rectangular outline of the patch area.



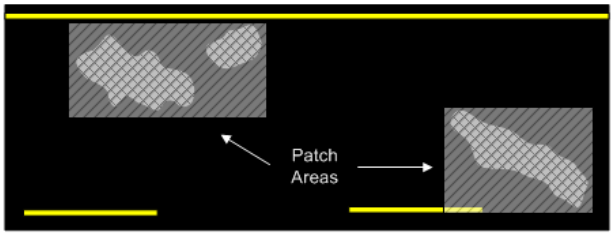
Elevation View



Elevation View



Plan View



Plan View

3. Blow water and any loose debris from the patch area.
4. Tack both the bottom and the sides of the patch area with asphalt emulsion.
5. Spray the asphalt emulsion and aggregate mixture into the patch area.
6. Cover the asphalt emulsion and aggregate mixture with a thin layer of uncoated aggregate.
7. Remove all signs and safety devices.

Special Considerations

If the distressed area is prepped prior to being patched, which includes squaring the distressed area and removing any loose debris, it is permanent shallow patching. Temporary patches typically require minimal, if any, prep work and consist of placing material in the pothole and tamping it.

Hand tools include but are not be limited to the following:

- Pavement saw
- Jackhammer with air compressor
- Vibratory compactor
- Vibrating plate
- Shovels
- Rakes
- Push brooms
- Lutes
- Hand tampers

APPROVED BY

Director, Highway Maintenance

Average Daily Production	4 STN – Short Tons	EFFECTIVE DATE	July 1, 2016

INDIANA DEPARTMENT OF TRANSPORTATION (INDOT)

Activity 2010 - Shallow Patching Quality Assurance Evaluation

District/ Sub district: _____ **Evaluation Date:** _____

WMS Location Code: _____ **Route:** _____ **RP Start:** _____ **End:** _____

Date Project completed: _____ **Evaluated by:** _____

QA Type: 1 Month (initial) None (follow-up) **Final Score:**

OBSERVATIONS:

1 Percentage of holes > 1 ' diameter and > 1" deep patched
(At least 10 holes in test area of 500')

			S1	S2	Avg
0	< 75%				
5	75 - 90%				
10	>90%	**Points:**	**0.00**	**0.00**	**0**

2 Percentage of holes flush within 1/2" of pavement surface

			S1	S2	Avg
0	< 75%				
5	75 - 90%				
10	>90%	**Points:**	**0.00**	**0.00**	**0**

3 Percentage of patches compacted

			S1	S2	Avg
0	< 75%				
5	75 - 90%				
10	>90%	**Points:**	**0.00**	**0.00**	**0**

4 Loose patch material present

			S1	S2	Avg
0	Significant amount				
5	Minor amount				
10	No loose material	**Points:**	**0.00**	**0.00**	**0**

5 Tracking

			S1	S2	Avg
0	Significant Tracking				
3	Minor Tracking				
5	No Tracking	**Points:**	**0.00**	**0.00**	**0**

cont.2

Activity 2010 - Shallow Patch Quality Assurance Evaluation

Judgment of Evaluator (Evaluator's Comments Required) **continue**

TOTAL POINTS:

Scoring Matrix

Final Score	6	5	4	3	2	1
Points	45					

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Temporary Shallow Patching	CODE	2011

Purpose

Temporary repair of minor patching of small areas of bituminous or concrete roadway or shoulder surfaces, where the depth does not extend through the width of the pavement. Temporary patching should be completed with hot or cold bituminous mixtures as well as asphalt emulsion and aggregate to correct potholes and edge failures in bituminous pavement and crack and joint spalling in concrete pavement.

Category Roadway/Drainage

- ☐ **PM**
- ☒ **QA**
- ☒ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Temporarily repair surface failures as soon as possible after they are reported. Temporary repairs should be made to alleviate hazardous conditions **until** permanent repairs can be made. Temporary repairs should be performed when permanent patching cannot be completed due to inclement weather conditions.

Reporting | **Reporting Units** Short Tons

Accomplishment is reported in STN – Short Tons.

STN (Short Tons) is equal to 2,000 lbs.

Accomplishment should be reported as the total of all material quantities added together.

This activity is for filling a distressed area with material and then compacting the material.

If the patching of the roadway includes additional work such as squaring the patch area and the use of asphalt emulsion for a tack coat. it should be reported to Activity 2010 – Permanent Shallow Patching.

If the sub-grade is removed and replaced during the patch, it should be reported to Activity 2020 – Deep Patching.

Crew Size — **4 - 6 Workers**

	QTY
Truck Driver/Laborer	2
Laborer	2 – 4

Note: Traffic Control Personnel are NOT shown here

Job Specific Equipment

	QTY
Asphalt Storage Trailer	1
Compactor	1
Hand Tools (See Special Considerations)	1
Spray Injection Patcher (Durapatcher)	1

Note: Traffic Control Equipment is NOT shown here

P.P.E.

1) Base P.P.E.

Materials

HMA Surface – Type B (STN – Short Ton)
INDOT Spec Section 902.01 (a)

Cold Mix Bituminous for Patching (STN – Short Ton)

Aggregate (STN – Short Ton)
INDOT Spec Section 904

Asphalt Emulsion (STN – Short Ton)
INDOT Spec Section 902.01 (b)

Other References

Sub Activities

Average Daily Production	3 STN – Short Tons	EFFECTIVE DATE	April 1, 2015

ACTIVITY	Temporary Shallow Patching	CODE	2011

Work Method

1. Place signs and safety devices.

Using an Asphalt Storage Trailer

2. Remove all loose material from the patch area.
3. Place hot mix or cold mix asphalt in the patch.
4. Compact the patch using a hand tamper or a vibratory compactor.
5. Remove all signs and safety devices

Using a Spray Injection Patcher

2. Blow water and any loose debris from the patch area.
3. Tack both the bottom and the sides of the patch area with asphalt emulsion.
4. Spray the asphalt emulsion and aggregate mixture into the patch area.
5. Cover the asphalt emulsion and aggregate mixture with a thin layer of uncoated aggregate. The final layer should be smooth/level with the adjacent pavement.
6. Remove all signs and safety devices.

Special Considerations

Do **NOT** heat the cold mix **above** 100°F as it will damage the material and affect the longevity of the patch.

Proper compaction can **NOT** be achieved by the back of a shovel.

If the distressed area is prepped prior to being patched, which includes squaring the distressed area and removing any loose debris, it is permanent shallow patching. Temporary patches typically require minimal, if any, prep work and consist of placing material in the pothole and tamping it.

Hand tools include but are not be limited to the following:

- Pavement saw
- Jackhammer with air compressor
- Vibratory compactor
- Vibrating plate
- Shovels
- Rakes
- Push brooms
- Lutes
- Hand tampers

APPROVED BY

Director, Highway Maintenance

Average Daily Production	3 STN – Short Tons	EFFECTIVE DATE	April 1, 2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Deep Patching	CODE	2020

Purpose

Major patching of roadway surface and paved shoulders to correct extensive surface failure caused by base failure, blowup, or settlement should be included on the Deep Patching activity. Included on all surface types; the full depth removal of surface and base material, and then the replacement of compacted bituminous or concrete mixtures.

Category Roadway/Drainage

- ☐ **PM**
- ☒ **QA**
- ☒ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

Schedule the repair of major surface failures or distortions caused by base failures as soon as possible after they are reported. Base should be completely thawed and temperature suitable for the placement of bituminous materials. If excavation equipment is needed, then a locate is needed with Indiana811.

Reporting **Reporting Units** Short Tons

Accomplishment is reported in materials used (STN-Short Ton)

Patching less than 100 feet should be reported to Activity 2020, greater than 100 feet should be reported to Activity 2991 Major Surface/Shoulder Improvements.

All materials used in patch should be reported to accomplishment.

Note: When using ready mix concrete for patch 1 sq. yd. = 2 tons of accomplishment.

Crew Size **4-7 Workers**

	QTY
Truck Driver/Laborer	3-6
Operator	1

*Traffic Control Personnel are NOT shown here

P.P.E.

Base PPE

Materials

HMA Base (Type B) (STN-Short Ton) - Spec Section 902.01(a)

HMA Surface (Type B) (STN-Short Ton)- Spec Section 902.01(a)

CA, Class A, CS, 53 (STN-Short Ton) - Spec Section 904

Binder, Tack (STN-Short Ton) - Spec Section 902.01(b)

Geogrid, Type II (YDK- Sq Yards) - Spec Section 918.05

Job Specific Equipment

	QTY
Dump Truck	1
Backhoe / Loader	1
Air Compressor	1
Concrete Saw	1
Jack Hammer	1
Compactor	1
Roller 10 Ton	1

*Traffic Control Equipment are NOT shown here

Other References

"Best Practices for Letting HMA Cool" Division of Maintenance memorandum

Sub Activities

Average Daily Production	11 - STN(Short Ton)	EFFECTIVE DATE	July 1, 2016

ACTIVITY	Deep Patching	CODE	2020

Work Method

Note: All deep patching activities on Interstate Highways shall have prior approval by District Pavement Engineer

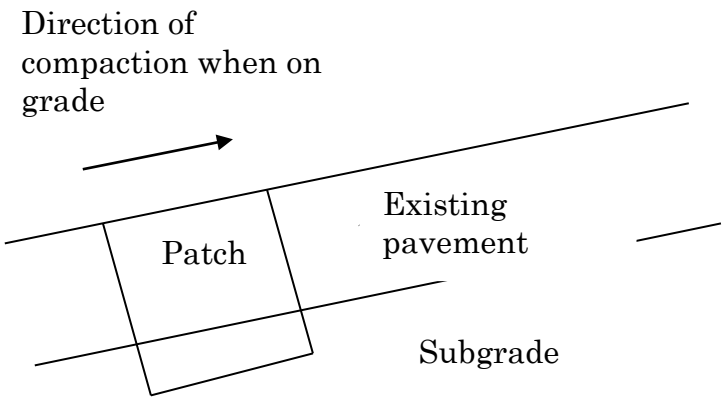
1. Call in a locate to Indiana811. This should be done 2 business days before any excavation begins.
2. Place signs and other safety devices.
3. Mark out the extent of the area to be patched. The outline should be rectangular with two sides at right angles to the direction of traffic. Make sure that the repair extends at least 1 foot into the sound adjacent surface. Patch size should be a minimum 2 ft X 2ft .With a pavement saw or pneumatic hammer, cut the outline of the patch.
4. Excavate the patch to the underside of the base layer and check the quality of the underlying sub-base by visual assessment. If the excavation reveals unstable subgrade material, such material should be removed to a minimum depth of 6 inches. Re-compact remaining materials and then replace removed material with No. 53 aggregate and compact.
5. Check the excavation for subsurface water and if present the installation of subsurface drains (Standard Drawing No. E 608-SHDR-01) may be required. ***Contact District Pavement Engineer for approval/recommendation of subsurface drainage method.***
6. Square up the sides of the patch area until vertical sides exist in reasonably sound pavement.
7. Apply tack coat , emulsified asphalt, or liquid asphalt to vertical faces of excavation.
8. Dump and spread bituminous mixture in lift depths according to following table:

Single Lift Depths (Note: Compact each lift thoroughly before adding next lift material)

Mix size	Minimum Thickness	Maximum Thickness
9.5mm	1.0”	2.0”
12.5mm	1.5”	3.0”
19.0mm	2.0”	4.0”
25.0mm	3.0”	6.0”

Place the mixture against the edges of the hole first (rather than in the center and then raking to the edges). Avoid pulling the material from the center of the patch to the edges. If more material is needed at the edge, it should be deposited there and the excess raked away. The amount of mixture used should be sufficient to ensure that after compaction, the patch surface will not be below that of the adjacent pavement. On the other hand, if too much material is used, a hump will result.

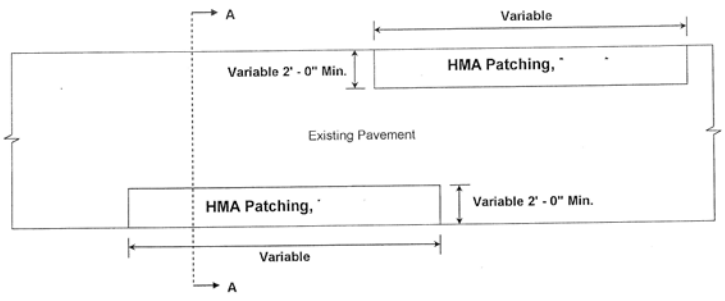
9. Compact each lift of the patch thoroughly. Use equipment that is suited for the size of the job. A vibratory plate compactor is excellent for small jobs, while a vibratory roller is likely to be more effective for larger areas.
10. When compacting the final lift , the edge of the patch should always be compacted first, followed by compacting the remaining patch area in the direction of traffic. Previous compacted areas should be overlapped by about 6 inches.. If there is a grade, compaction should proceed from the low side to the high side to minimize possible shoving of the mix.



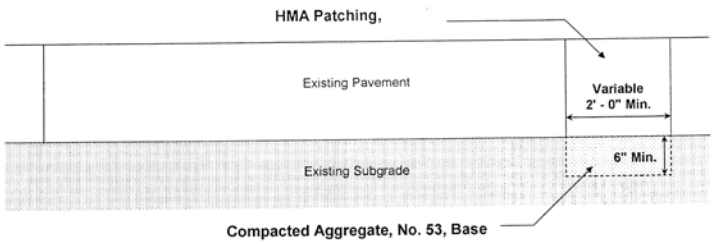
ACTIVITY	Deep Patching	CODE	2020

11. Check the vertical alignment and smoothness of the patch with a straight edge or stringline.
12. Clean up work area- sweep loose material away from patched area and off road surface.
13. Remove signs and safety devices.

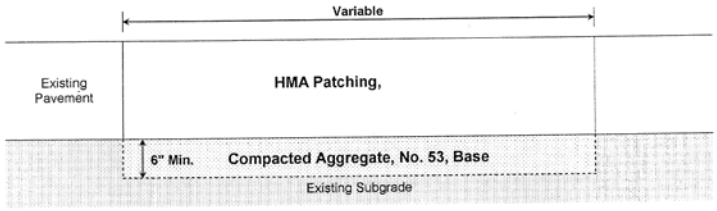
Full Depth HMA Patching Detail



(Plan View)



(Section A - A)



(Longitudinal View)

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	11 - STN(Short Ton)	EFFECTIVE DATE	July 1, 2016

INDIANA DEPARTMENT OF TRANSPORTATION (INDOT)

Activity 2020 - Deep Patching Quality Assurance Evaluation

District/ Sub district: _____ **Evaluation Date:** _____

Location : _____ **Route:** _____ **RP Start:** _____ **End:** _____

Date Project completed: _____ **Evaluated by:** _____

QA Type: 60-90 days (initial) 6-8 Month (follow-up) **Final Score** **0%**

OBSERVATIONS: **Follow up** **0%**

1 Patch squared with adjacent pavement (exclude areas < 1')

			S1	S2	Avg
0	More than 1 side not squared				
5	1 side not squared	**Points:**	**0.00**	**0.00**	**0**
10	Squared all sides				

2 Patch covers distressed area (exclude shoulder side for patches >25')

			S1	S2	Avg
0	More than 1 side				
5	1 side				
15	All sides	**Points:**	**0.00**	**0.00**	**0**

3 Patch flush with adjacent pavement 60-90 days (initial) 6-8 Month (follow-up)

			S1	S2	Avg
0	> 3/4 "				
8	≥ 1/4 " and ≤ 3/4 "		**0.00**	**0.00**	**0**
15	< 1/4 "	**Follow Up:**	**0.00**	**0.00**	**0**

4 Patch Compacted?

			S1	S2	Avg
0	No				
10	Yes	**Points:**	**0.00**	**0.00**	**0**

5 Compaction Equipment? (from work order day card)

			S1	S2	Avg
0	No				
5	Yes	**Points:**	**0.00**	**0.00**	**0**

6 Patch area cleaned

			S1	S2	Avg
0	Piles of material on shoulder, significant loose mat'l in lane				
5	Minor loose material on lane or shoulder				
10	No loose material	**Points:**	**0.00**	**0.00**	**0**

7 Pavement markings re-established (for patches > 100 ')

			S1	S2	Avg
0	No				
5	Yes	**Points:**	**0.00**	**0.00**	**0**

8 Indication of poor drainage (mud, pumping, water at joints)

			S1	S2	Avg
0	Yes				
5	No	**Points:**	**0.00**	**0.00**	**0**

cont.2

Activity 2020 - Deep Patch Quality Assurance Evaluation

Page 2

Judgment of Evaluator (Evaluator's Comments Required) **continue**

TOTAL POINTS:

Observation #		1	2	3	4	5	6	7	8
Points	75	10	15	15	10	5	10	5	5

Follow-Up Observations *(6-8 months)*

Observation #	3	Total
Available Points	15	15
Average QA Scored		0

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

BEST PRACTICES FOR LETTING HMA COOL

ACTIVITIES 2010, 2020, 2030

To assist in determining the appropriate cooling methods, the Division of Maintenance has put together best practices for HMA cooling prior to allowing traffic. Below is a website that can be utilized when determining the appropriate cooling times for HMA, given the current conditions at the site.

http://www.hotmix.org/index.php?option=com_content&task=view&id=178&Itemid=272.

Best Practices:

- The best cooling practices, for a permanent fix or an interim fix, is to let the HMA cool on its own and check temperatures at the site after the HMA is placed and do not cool the HMA with water. It is imperative that any permanent fix follows this practice for cooling, since rapid cooling could be detrimental to the HMA (See "CAUTION" note below).
- To return traffic on the HMA the temperature should be 175°F or less
- HMA mixture will resist compaction within the temperature range of 170°F -180°F
- For a patch that would be considered an interim fix until a more permanent fix is in place, cooling with water may be applicable to return the traffic sooner. Just ensure that rolling and compacting is done PRIOR to placing water. Also, if the patch involves multiple lifts, it is important that any standing water or steam has been removed so that the next lift is not placed on standing water or steam is trapped between lifts.
    - CAUTION: Cooling with water may be detrimental to the HMA performance as it could cool the HMA too quickly and cause density issues, or if water is applied at or above 212°F a steam may form as the water is boiled off and may cause raveling or rutting if the bond is broken between the asphalt cement and the aggregate. If the bond is not broken the steam could still cause premature aging of the asphalt and create a cracking issue with the pavement.

The following are examples from the above website:

- 9AM, 80 degree day, humid and hazy, 5 mph wind speed, 1.5" HMA on granular base, 300 degree initial temp takes 23 minutes to cool to 175 degrees
- 3PM, 75 degree day, clear and dry, 10 mph wind speed, 2" HMA on concrete, 300 degree initial temp takes 32 minutes to cool to 175 degrees.
- 2PM, 65 degree day, mostly cloudy, 15 mph wind speed, 3" HMA on granular base, 300 degree initial temp takes 43 minutes to cool to 175 degrees

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Spot Paving	CODE	2030

Purpose

Spot paving is used to report machine paving of isolated areas of bituminous or concrete roadway and shoulder surfaces. Hot bituminous mixtures are applied to correct depressions at bridge ends, surface failures, and depressions caused by settlement at pipe replacements and deep patches.

Category Roadway/Drainage

- ☐ PM
- ☒ QA
- ☒ Unit Cost
- ☒ Plan Location

Scheduling & Coordination

Schedule the repair of those deficiencies causing a hazardous ride at the posted speed limit. Paving of long sections to correct minor crown deficiencies, settlement between paved shoulder and road surfaces, rutting and grade depressions should be scheduled by material and equipment availability. Do not do within 2 years of upcoming road project.

Coordinate with Traffic for pavement markings if applicable.

Reporting — **Reporting Units**: Tons

Accomplishment shall be reported in tons of premix

New pavement in new locations, such as turn lanes or deceleration lanes are reported to Activity 2991- Major Surface/Shoulder Improvements

Continuous paving greater than ½ mile would be considered a “capital project” and should be reported to Activity 2991- Major Surface/Shoulder Improvements

Crew Size — **8-13 Workers**

	QTY
Distributor Oper./Laborer	1
Truck Driver	3
Laborer	2-7
Grader or Paver Operator	1
Roller Operator	1

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

	QTY
Distributor/Tar Kettle	1
Dump Trucks	3
Grader or Paver	1
Roller	1
Pavement Grinder	1
Sweeper	1

*Traffic Control Equipment are NOT shown here

P.P.E.

Base PPE

Materials

Bituminous Mixture HMA Surface (STN- Short Ton) Spec Section 902.01(a)

Bituminous Material AE-T (tack oil) (STN-Short Ton) Spec Section 902.01(b)

Other References

INDOT Spec Section 402.07(b) Composition Limits for HMA Wedge and Leveling Mixtures.

Sub Activities

Average Daily Production	105 Tons	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Spot Paving	CODE	2030

Work Method

1. Place signs and safety devices
2. Mark approximate limits of area to be wedged using string line or straight edge
3. Mill transition areas (Butt joints)
   Butt joints allow the pavement thickness to continue all the way to the edges and avoids feathering or thinning down asphalt to meet connections.
4. Sweep surface to remove loose material (as required)
5. Apply a bituminous tack coat on area to be leveled
6. Spread bituminous mixture in lifts of not more than 3 “
7. Compact bituminous mixture
   Compaction operations will begin at low side and proceed to high side. The roller wheel shall overlap previous pass by a minimum of 6”. Roller speed shall be limited to < 3mph. Compaction temperature range is 185 °F to 300 °F
8. Make sure the final layer matches the existing surface and pavement edge. Check with a string line or straight edge to make sure the final surface will provide smooth riding
9. Clean up the work area and sweep loose material off road surface
10. Seal butt joints with asphalt emulsion.
11. Remove signs and safety devices

Special Considerations

High cost activity.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	105 Tons	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION

Activity 2030 - Spot Paving Quality Assurance Evaluation

District/Subdistrict _____ **Evaluated by** _____

WO # _____ **Route** _____ **RP Start** _____ **RP End** _____

Date Project Completed _____ **Initial Date** _____ **Follow Up Date** _____

QA Timing: Initial = 2 - 3 Month; Follow Up = 12 Months

Final Score 0%

OBSERVATIONS

Follow-up Score 0%

1 Is the wedge feathered or milled in at the ends (smooth transitions)?

0 No feathering
3 Feathered but not milled
10 Milled

Points ☐

2 Does the wedge cover the distressed area?

0 No
10 Yes

Points ☐

3 Is the wedge feathered or milled flush at the CL joint and curbline (where applicable)?

0 No
10 Yes

Points ☐

4 Is the wedge compacted?

0 No
10 Yes

Points ☐

5 Was compaction equipment used? (from the work order day card)

0 No
5 Yes

Points ☐

6 Was emulsion used on the patch? (from the work order day card)

0 No
10 Yes

Points ☐

7 How does the wedge ride?

0 Significant dips or waves, both longitudinal and transverse
5 Minor ride deficiency
10 Wedge rides virtually identical to the adjacent pavement

Points ☐

Follow-up Points ☐

continued on page 2

Activity 2030 - Spot Paving Quality Assurance Evaluation

8 Is the surface uniform?

0 Surface pitted, gouged by equipment or material is missing

5 No imperfections on the surface **Points** ☐

9 Is the wedge area clean?

0 Significant amount of loose material; piles of material on the shoulder

5 No loose material **Points** ☐

10 Is the correct material on the surface?

0 HMA Intermediate, Base or Other

10 HMA Surface **Points** ☐

11 Are the pavement markings reestablished for wedges > 100 ft?

Is the patch > 100 ft? ☐

0 No

3 Centerline only

5 Centerline and edgeline **Points** ☐

12 What is the condition of the surface?

0 Depressions or ruts > 1"

8 Depressions or ruts between ¼" and 1" or reflective cracking

15 Uniform transverse cross section with no reflective cracking **Points** ☐

Follow-up Points ☐

Judgment of Evaluator (Evaluator's Comments Required)

Initial Score **TOTAL POINTS** ☐

Observation #		1	2	3	4	5	6	7	8	9	10	11	12
Possilbe Points	105	10	10	10	10	5	10	10	5	5	10	5	15
Actual Points	0	0	0	0	0	0	0	0	0	0	0	0	0

Follow-up Score

Observation #		7	12
Possilbe Points	25	10	15
Actual Points	0	0	0

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Full Width Shoulder Seal Coat	CODE	2040

Purpose

Seal Coating of continuous full width sections of paved or aggregate shoulder surface with a single application of hot liquid bituminous material and aggregate chips. This treatment is used to address low to moderate severity cracking,oxidation, seal the surface, and extend shoulder life.

Category Roadway/Drainage

- ☒ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

This work should be scheduled on shoulders with low to moderate cracking, oxidation, or drying out of bituminous material. Schedule this work in conjunction with supporting operations to be completed prior to sealing, such as squeegee sealing or patching. The shoulder in most cases should not be sealed by seal coat before May 1 or after October 1. The pavement surface and ambient temperature should be over 60°F. Coordinate pavement striping with Traffic.

Reporting **Reporting Units** Foot Miles

Accomplishment shall be reported in FTM- Feet Mile.

FTM (Foot Mile) is width of shoulder (ft) X miles completed (mi).

Reporting should include prep work such as placing advance signage, covering of pvmt markings in preparation for sealing and any other prep work. No accomplishment is reported for these items.

Shoulder sealing of 2' or less done in the same operation as mainline seal coat should be reported to Activity 2050.

Conversion of gallons of liquid bituminous to tons is equal to (# gallons)/ 236.

Double or Triple application seal coat is reported to Activity 2991.

Crew Size **14-20 Workers**

	QTY
Distributor Driver/Operator	2
Chip Spreader Operator	2
Roller Operator	2
Power Broom Operator	2
Truck Driver	3-9
Laborer	3

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

	QTY
Sweeper	2
Distributor	2
Aggregate Spreader	1
Roller Rubber Tired	2
Loader	1
Dump Truck	4-9

*Traffic Control Equipment is NOT shown here

P.P.E.

1) Base PPE

2) Respiratory Protection (1 strap dust mask - broom sweepers)

Materials

Liquid Bituminous (AE-90S) (Gal-Gallons) INDOT Spec Section 902.01(b)

Coarse Aggregate (STN- Short Ton) INDOT Spec Section 904

Liquid Bituminous (AE-90) (Gal-Gallons) INDOT Spec Section 902.01(b)

Other References

Treatment Guidelines for Pavement Preservation

INDOT Standard Specification Section 404

Operations Memorandum 11-03 ; Construction Signage Pavement Markings for Chip/Fog Seal Projects

Operations Memorandum 12-04 ; Guideline For Seal Coat On Paved Shoulders

Sub Activities

86- PPI Pavement Preservation

Average Daily Production	65 FTM- Foot Miles	EFFECTIVE DATE	July 1, 2013

ACTIVITY	Full Width Shoulder Seal Coat	CODE	2040

Work Method

1. Place signs and safety devices

2.Sweep loose debris from pavement ahead of seal coat operation

3. Cover all castings,detector housing and rpm's

4. Apply heated (150 degrees) liquid bituminous AE-90S to match speed of aggregate spreader. Apply even coverage while avoiding stops as much as possible to eliminate excessive joints.

Typical Emulsion Application Rates

SC 11 = 0.36 To 0.40 Gal/SYD

SC 12 = 0.29 To 0.33 Gal/SYD

SC 16 = 0.36 To 0.40 Gal/SYD

5. Spread single layer of aggregate immediately (within 1 minute) onto roadway

Typical Aggregate Application Rates

SC 11 = 16 To 20 Lb/SYD

SC 12 = 14 To 17 Lbl/SYD

SC 16 = 20 Lb/SYD

6. First roller pass shall be completed within 2 minutes of aggregate application

Roll the aggregate so entire width of the treatment area is covered in one pass of all the rollers

7. Rollers shall make at least three passes, with the final rolling within 30 minutes after aggregate application

8. After 24 Hours: sweep excess aggregate from pavement

9. Coordinate with traffic for final markings

10. Clean off/uncover rpm's

11. Remove signs and safety devices

ACTIVITY	Full Width Shoulder Seal Coat	CODE	2040

Special Considerations

Approval from Technical Services (District Pavement Engineer) is required before seal coat placement on shoulder greater than 2 feet wide.

Calibration of seal coat equipment is a critical practice that should be conducted prior to seal coat.Calibration of seal coat equipment is a critical practice that should be conducted prior to seal coat. The aggregate spreaders, distributors, and rollers are equipment which needs calibration.

Traffic should not be allowed on a seal coat surface until after rolling and after the bituminous

material has set and cured. Typically 45 minutes to 2 hours.

Dry pavement, no rain forecast for at least 24 hours

The pavement surface and ambient temperature should be over 60°F.

Haul trucks: avoid turns, watch speed, and watch for aggregate leakage

Haul Trucks =

Distance (mi)	# Trucks
5	4
10	6
15	7
20	9
25	10
30	12

Rollers: watch speed ≤ 5mph, hard stops, takeoffs, and turns which can displace aggregate

Brooms: watch down pressure to avoid displacing embedded aggregate

High cost activity

APPROVED BY

Director, Highway Maintenance

Average Daily Production	65 FTM- Foot Miles	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Shoulder Fog Seal	CODE	2041

Purpose

Fog seal continuous full width sections of paved or seal coated shoulders with asphalt emulsion material to remediate aging and oxidation, lock in loose aggregate on seal coats, and to prevent deterioration of the surface.

Category Roadway/Drainage

- ☒ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

Schedule this work in conjunction with supporting operations to be completed prior to sealing, such as squeegee sealing, patching, or mainline fog and seal coat. Wait approximately two days after seal coat to apply fog seal.Coordinate this activity with pavement striping by District Traffic.

Reporting | **Reporting Units** Foot Miles

Accomplishment shall be reported in FTM- Foot Miles

FTM (Foot Miles) is equal to width of shoulder (ft) X miles completed (mi)

Conversion of gallons of liquid bituminous to tons is equal to (# gallons)/ 236.

Crew Size 5 Workers

	QTY
Distributor Driver/Operator	2
Truck Driver	1
Laborer	2

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

	QTY
Distributor	2
Dump Truck	1
Power Broom	1

*Traffic Control Equipment are NOT shown here

P.P.E.

1) Base PPE

2) Respiratory Protection (1 strap dust mask - broom sweepers)

Materials

Liquid Bituminous AE-F (Gal-Gallons) INDOT Spec Section 902.01(b)

Sand (STN-Short Ton) INDOT Spec Section 904.02

Other References

INDOT Recurring Special Provision 412-R-549

Treatment Guidelines for Pavement Preservation

Sub Activities

86- PPI Pavement Preservation

Average Daily Production	100 FTM (Foot Mile)	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

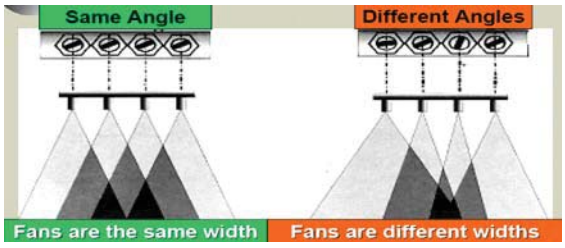
ACTIVITY	Shoulder Fog Seal	CODE	2041

Work Method

1. Place signs and safety devices
2. Cone off lanes for any long closures
3. Existing pavement should be cleaned by brooming operation
4. Cover all castings, detector housing and rpm's
5. Apply liquid bituminous material with Distributor at maximum speed of 5 mph. The emulsion application rate typically ranges from 0.10 to 0.15 gal/yd2.The emulsion should be applied uniformly at a rate within ± 0.02 gal/syd of the target application rate.
6. Fine aggregate should be applied to pedestrian cross-walks, drive-ways, or other areas where traffic needs to cross fresh seal prior to emulsion cure.
7. Applied emulsion should be sufficiently cured before traffic is permitted to avoid tracking. Curing will depend on environmental factors, but traffic can typically be restored in 30 minutes.
8. Coordinate with traffic for final markings
9. Clean/uncover rpm's
10. Remove signs and safety devices

Special Considerations

Streaks in the fog seal indicate a clogged nozzle or an improper overlap of spray from adjacent nozzles. The problem needs to be corrected prior to proceeding with the application of the fog seal



Emulsion should be evenly distributed with the target application rate.

Ambient air or Pavement temperature should be minimum 60 degrees with no rain forecast for 24 hours

Must use correct nozzles -Etnyre #3353788

High cost activity

APPROVED BY

Director, Highway Maintenance

Average Daily Production	100 FTM (Foot Mile)	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Mainline Seal Coat	CODE	2050

Purpose

Seal coat continuous full width section of roadway surface with a single application of liquid asphalt emulsion and aggregate to address longitudinal, transverse and block cracking in low to moderate severity level, as well as raveling, low severity bleeding, and prevent moisture infiltration. Dry, raveled pavements are also addressed by seal coating.

Category Roadway/Drainage

- ☒ **PM**
- ☒ **QA**
- ☒ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

Schedule this work in conjunction with supporting operations to be completed prior to seal coating, such as crack sealing/filling or patching. This work should be performed on areas where water is penetrating the surface but not where a structural deficiency exists. The travel lane and auxiliary lanes should not be sealed by a seal coat before May 1 or after October 1. The pavement surface and ambient temperature should be over 60°F. Coordinate the pavement striping with District Traffic.

Reporting — **Reporting Units** Lane Miles

Accomplishment is reported in LNM - Lane Miles.

Each road should be completed on one work order with multiple day cards.

All work involved in a seal coat is reported to 2050, but the only accomplishment reported is placing the seal coat.

Installing/removing signage (no accomplishment), installing/removing detours and closures (no accomplishment), covering/ uncovering rpm's (no accomplishment), placing seal coat (accomplishment), follow-up brooming (no accomplishment)

All equipment should be reported for the full amount of time used, which includes 24 hours/day for programmable message boards.

If the chip spreader can expand wide enough to cover two feet beyond the mainline edge onto the shoulder in one pass, then seal beyond mainline onto the paved shoulder. This two foot amount of the shoulder, when completed in conjunction with the mainline, should be reported to this activity.

Record the cost and number of installed pop-up markers to the work order.

Record daily all aggregate and asphalt emulsion application rates on to "Activity 2050 - Seal Coat Application Rate Form" and attach it to the work order. Rates should be checked and recorded at least twice per day (AM/PM).

Conversion of asphalt emulsion gallons to Tons is equal to the number of gallons ÷ 236.

If a fog seal is applied after the seal coat, all work done on the road after the fog seal has started should be reported to 2051 - Mainline Fog Seal. This includes but is not limited to the cleaning of the rpm's and removal of signage.

Double or triple application seal coats are reported to Activity 2991 - Major Surface/Shoulder Improvements.

Average Daily Production	6 LNM – Lane Miles	EFFECTIVE DATE	April 1, 2015

ACTIVITY	Mainline Seal Coat	CODE	2050

Crew Size — 17 - 28 Workers

	QTY
Distributor Operator	2 – 3
Aggregate Spreader Operator	2
Self-propelled Broom Operator	2 – 3
Pneumatic Roller Operator	2 – 3
Dump Truck Driver	6 – 14
Laborer	3

Note: Traffic Control Personnel are NOT shown here

Job Specific Equipment

	QTY
Distributor Operator	2 – 3
Aggregate Spreader Operator	1
Self-propelled Broom Operator	2 – 3
Pneumatic Roller Operator	2 – 3
Dump Truck Driver	6 – 14

Note: Traffic Control Equipment is NOT shown here

P.P.E.

1) Base P.P.E.

2) Respiratory Protection - Single Strap Dust Mask (Broom Operators)

Materials

Liquid Bituminous (AE-90S/CRS-2P) (Gal - Gallons)
INDOT Spec Section 902.01(b)

Coarse Aggregate (STN - Short Ton)
INDOT Spec Section 904

Other References

Treatment Guidelines for Pavement Preservation

INDOT Standard Specification Section 404

Operations Memorandum 14-03 - Seal Coat Operational Guidelines

Operations Memorandum 6-01 - Use of Worksite Speed Limit Assembly Signs

Sub Activities

86- PPI- Pavement Preservation

Work Method

1. Prior to the start of the job, place all necessary signs and traffic control devices for any closures and detours. Coordinate the chip seal schedule from beginning to end with Traffic.

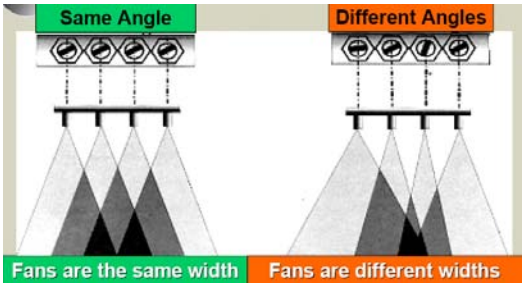
2. Place all necessary signs and traffic control devices for road construction.

3. Close the road/lane to traffic. If the chip seal will be constructed under traffic, the use of a pilot vehicle to control traffic speeds is encouraged.

4. Sweep the roadway surface of any loose debris in front of the distributors.

5. Install temporary pop-up rpm reflectors, if necessary. Cover all rpms, castings and detector housings with sand or temporary tape.

6. Spray heated (≈ 150°F) asphalt emulsion (ie. AE-90S) at the appropriate rate to match the speed of the aggregate spreader. Apply even coverage while avoiding excessive stops as much as possible, to prevent unnecessary joints. Ensure that the nozzles are orientated at the same angle to achieve even application.



ACTIVITY	Mainline Seal Coat	CODE	2050

Work Method (continued)

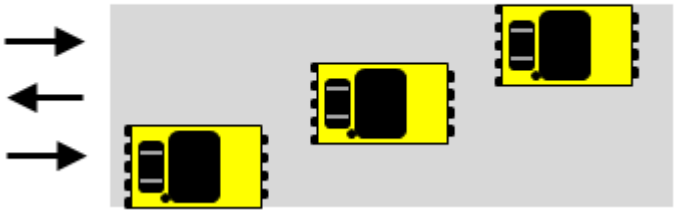
7. **Within 1 minute**, spread a single layer of aggregate onto the asphalt emulsion. Do **NOT** allow the asphalt emulsion to break before the aggregate is spread onto the roadway to allow for proper embedment of the aggregate.

	Typical Application Rates	
Material	Aggregate	Asphalt Emulsion
SC 11	16 - 20 lb/yd²	0.36 - 0.40 gal/yd²
SC 12	14 - 17 lb/yd²	0.29 - 0.33 gal/yd²
SC 16	18 - 20 lb/yd²	0.36 - 0.40 gal/yd²

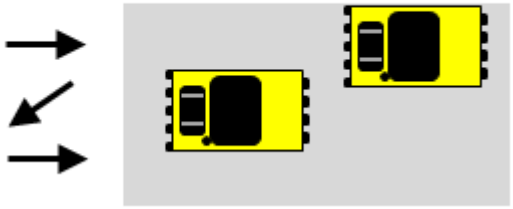
8. The first pneumatic roller pass should be completed **within 2 minutes** of the aggregate being applied.

9. The pneumatic rollers should make **at least 3 passes** with the final rolling taking place **within 30 minutes** of the aggregate application.

Three Roller Pattern



Two Roller Pattern



10. **No later than the morning after placement chip seal**, the road surface should be swept to remove excess aggregate from the pavement.

11. If the road will be fog sealed, all future work should be reported to Activity 2051 - Mainline Fog Seal.

12. After completion of the chip seal, all rpms should be uncovered and cleaned.

13. Coordinate with Traffic to schedule the painting of the final markings.

14. After the new traffic lines are painted, remove all signs and traffic control devices.

Special Considerations

Planning

Calibration of the chip seal equipment is critical to the success of the chip seal operation. The distributors (application rate), aggregate spreader (application rate) and pneumatic rollers (tire pressure and weight) should be properly calibrated **at minimum** at the beginning of the construction season.

When stockpiling SC aggregate, take care to stock the aggregate on hard surfaces away from dust or mud contamination. SC aggregate is a premium material due to it being manufactured cleaner. Loader operators need to ensure they are using proper loading techniques, which include not dipping into underlying dirt, stone or other contamination. Operators should also handle the material a minimal number of times.

CRS-2P has a different chemical composition that is incompatible with our traditional emulsions, such as AE-90S or AE-F. Residual materials **must be thoroughly cleaned** from the distributor tank and spray bar when switching to CRS-2P or from CRS-2P.

ACTIVITY	Mainline Seal Coat	CODE	2050

Special Considerations (continued)

Make note of the existing pavement markings including the lane width. Coordinate with Traffic to ensure proper lane widths are striped to prevent edge deterioration.

Ensure that Customer Service, the PIO, Traffic, etc. are notified when the work plans are built, 14 calendar days prior to the start of the job and after completion of the job.

Ensure that the chip seal is entered into CARS for the duration of the job.

Construction

The pavement must be dry with no rain expected for at least 24 hours.

The pavement temperature and ambient air temperature should be **above** 60°F.

The asphalt emulsion **should be delivered** between 140°F and 185°F. The temperature should be taken at the time of delivery from the vendor's tanker. See material specifications for rejection or penalty range.

The haul trucks should stagger their wheel paths when backing to the aggregate spreader. Trucks should always avoid sharp turns on the chip seal and should limit turning around to public roads, not private driveways. The trucks also need to drive at an appropriate speed on the chip seal to minimize possible damage to vehicles. Finally, the driver should check for any aggregate leakage from the tailgate.

Self-propelled brooms should minimize down pressure that can displace embedded aggregate.

The pneumatic rollers should limit their speed to an acceptable speed that is not damaging the chip seal. An acceptable speed should not displace aggregate and includes gradual take offs, avoiding hard stops and any turns that can displace aggregate. They should also be ballasted per the manufacturer's recommendations.

When chip sealing in residential areas, try to minimize loose stone and spillages. Street sweepers are highly recommended instead of self-propelled brooms in these areas to avoid throwing aggregate into yards, sidewalks and roadside landscaping.

Traffic should not be allowed on the chip seal until after the final rolling and after the asphalt emulsion has set and sufficiently cured. This is typically 45 minutes to 2 hours which is heavily dependent on the weather conditions.

Estimated Number of Haul Trucks	
Maximum One-way Haul Distance	Number of Trucks Recommended
5	6
10	10
15	14
20	19
25	23
30	27

APPROVED BY

Director, Highway Maintenance

Average Daily Production	6 LNM – Lane Miles	EFFECTIVE DATE	April 1, 2015

INDIANA DEPARTMENT OF TRANSPORTATION

Activity 2050 - Mainline Seal Coat Quality Assurance Evaluation

District/Subdistrict _____ **Evaluated by** _____

WO # _____ **Route** _____ **RP Start** _____ **RP End** _____

Date Project Completed _____ **Initial Date** _____ **Follow Up Date** _____

QA Timing: Initial = 1 Month; Follow Up = 12 Months **Final Score** 0%

OBSERVATIONS **Follow-up Score** 0%

1 Is excessive/loose stone present?

		S1	S2	AVG
0	Loose stone on mainline; significant amount of waste stone on the shoulder			
3	No loose stone on mainline; some waste stone on the shoulder			
5	No evidence of loose stone **Points**			

2 Are the raised pavement markers (RPMs) protected?

No RPMs = 20 points

		S1	S2	AVG
0	RPMs completely buried/covered			
10	RPMs protected but still covered/partially visible			
20	RPMs clean and visible **Points**			

3 Are there permanent pavement markings?

		S1	S2	AVG
0	No pavement markings			
5	Temporary markings or the RPMs are clean			
7	Permanent markings with mismatched pattern or centerline only			
10	Permanent markings (EL,CL, special) match existing **Points**			

4 Is there longitudinal bleeding in the wheelpath present?

		S1	S2	AVG
0	Excessive bleeding > 1000 ft continuous with smooth/slick surface			
5	Excessive bleeding < 1000 ft continuous with smooth/slick surface			
10	Wheelpaths darker/smoother than the rest of the lane; fair texture			
15	No evidence of bleeding; good macrotexture **Points**			
	Follow-up Points			

5 Is tracking present?

		S1	S2	AVG
0	Significant tracking on side roads, driveways and/or bridge decks			
3	Minor tracking on side roads, driveways and/or bridge decks			
5	No evidence of tracking **Points**			

continued on page 2

Activity 2050 - Mainline Seal Coat Quality Assurance Evaluation

6 Is there a full-width seal coat application?

			S1	S2	AVG
0	> 1 ft of the mainline unsealed				
5	< 1 ft of the mainline unsealed				
10	Mainline has a full-width seal coat	**Points**			

7 Is aggregate loss present?

No "Seal Coat Application Rate Form" = 0 points (for Initial Evaluation Only)

			S1	S2	AVG
0	> 50% aggregate loss for > 1000 ft; No "Seal Coat Application Rate Form" on Initial Evaluation				
10	> 50% aggregate loss for < 1000 ft				
15	No evidence of aggregate loss	**Points**			
		Follow-up Points			

8 Is there evidence of transverse joints bleeding?

			S1	S2	AVG
0	Transverse joints are bleeding				
10	Transverse joints are clean/neat	**Points**			
		Follow-up Points			

Judgment of Evaluator (Evaluator's Comments Required)

Initial Score **TOTAL POINTS**

Observation #		1	2	3	4	5	6	7	8
Possilbe Points	90.0	5.0	20.0	10.0	15.0	5.0	10.0	15.0	10.0
Actual Points	0.0								

Follow-up Score

Observation #		4	7	8
Possilbe Points	40.0	15.0	15.0	10.0
Actual Points	0.0			

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

Seal Coat Application Rate Form

Activity 2050

District _____ Sub-District _____ Road _____ WO # _____

		Weather Conditions				Road Conditions				Material Usage				Application Rate		
Date	Time	Air Temperature (°F)	Sky Conditions	Wind Speed (mph)	Pavement Temperature (°F)	Lane Width (feet)	From RP	To RP	AM or PM Accomplishment (Lane Miles)[B]	Aggregate Size (#11, #12, #16)	Aggregate Type (Gravel, Limestone, etc.)	Aggregate (Tons)	Asphalt Emulsion (gallons)	Aggregate (lb/yd²)	Asphalt Emulsion (gal/yd²)	Evaluator's Initials
						(A)			(B)			(C)	(D)	(E)	(F)	
	AM															
	PM															
	AM															
	PM															
	AM															
	PM															

Comments

Sky Conditions	Cloud Cover
Cloudy	90 - 100%
Mostly Cloudy	70 - 90%
Partly Cloudy/Partly Sunny	30 - 70%
Mostly Sunny	10 - 30%
Sunny	0 - 10%

Square Yards Sealed

$SY = (A \times B \times 5280) \div 9$

Rate Calculations

Aggregate Application Rate

$E = C \times 2000 \div SY$

Asphalt Emulsion Application Rate

$F = D \div SY$

Notes: *A - A separate form is needed for each road unless multiple roads are done on the same work order*

B - "AM or PM Accomplishment" is the production, in lane miles, during the AM or PM period of the workday during which the application rates are checked. The "AM or PM Accomplishment" for the AM and PM should total the daily production for the given day.

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Mainline Fog Seal	CODE	2051

Purpose

Fog seal continuous full width sections of paved roadway with asphalt emulsion material to remediate aging and oxidation, to lock in loose aggregate on mainline seal coats and to prevent deterioration of the surface.

Category Roadway/Drainage

- ☒ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

Schedule this work in conjunction with supporting operations to be completed prior to fog sealing, such as crack sealing/filling, patching, roadway sweeping, herbicide spraying and mainline seal coating. Wait a minimum of two days after a seal coat before applying the fog seal. The travel lane and auxiliary lanes should not be sealed by a fog seal before May 1 or after October 1. The pavement surface and ambient temperature should be over 60°F. Coordinate the pavement striping with District Traffic.

Reporting | **Reporting Units** Lane Miles

Accomplishment is reported in LNM - Lane Miles.

Each road should be completed on one work order with multiple day cards.

All work involved in a fog coat is reported to 2051, but the only accomplishment reported is applying the fog seal.

All work completed on the road after the fog seal has started should be reported to 2051 - Mainline Fog Seal. This includes but is not limited to the cleaning of the rpm's and removal of signage.

All equipment should be reported for the full amount of time used, which includes 24 hours/day for programmable message boards.

Conversion of asphalt emulsion gallons to Tons is equal to the number of gallons ÷ 236.

Crew Size — 7 – 8 Workers

	QTY
Distributor Operator	2
Dump Truck Driver	1
Laborer	4 – 5

Note: Traffic Control Personnel are NOT shown here

Job Specific Equipment

	QTY
Distributor Operator	2
Self-propelled Broom Operator	2 – 3
Dump Truck Driver	1
Crew Cab Driver	1

Note: Traffic Control Personnel are NOT shown here

P.P.E.

1) Base P.P.E.

2) Respiratory Protection - Single Strap Dust Mask (Broom Operators)

Materials

Liquid Bituminous (AE-F) (Gal - Gallons) INDOT Spec Section 902.01(b)

Fine Aggregate (STN - Short Ton) INDOT Spec Section 904.02

Other References

Treatment Guidelines for Pavement Preservation

INDOT Standard Specification Section 412

Operations Memorandum 14-03 - Seal Coat Operational Guidelines

Operations Memorandum 6-01 - Use of Worksite Speed Limit Assembly Signs

Sub Activities

86- PPI- Pavement Preservation

Average Daily Production	10 LNM – Lane Miles	EFFECTIVE DATE	October 1, 2015

ACTIVITY	Mainline Fog Seal	CODE	2051

Work Method

1. Prior to the start of the job, place all necessary signs and traffic control devices for any closures and detours. Coordinate the chip seal schedule from beginning to end with Traffic.

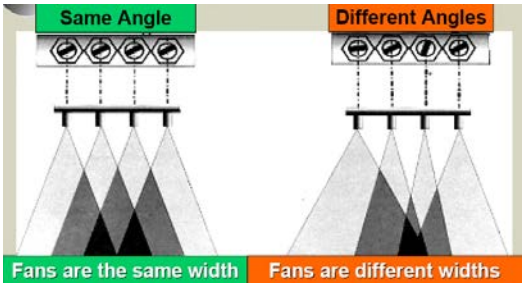
2. Place all necessary signs and traffic control devices for road construction.

3. Close the road/lane to traffic. If the fog seal will be constructed under traffic, the use of a pilot vehicle to control traffic speeds is encouraged.

4. Sweep the roadway surface of any loose debris in front of the distributors.

5. Cover all pop-up reflectors, rpms, castings and detector housings with sand or temporary tape.

6. Spray heated (≈ 150°F) asphalt emulsion (i.e. AE-F) at a maximum speed of 5 mph. Apply even coverage while avoiding excessive stops as much as possible, to prevent excessive application. Ensure that the nozzles are orientated at the same angle to achieve even application. The emulsion application rate typically ranges from 0.10 gal/yd² to 0.15 gal/yd². The emulsion should be applied uniformly at a rate ± 0.02 gal/yd² of the target application rate.



7. Use sand to avoid tracking when the application coincides with pedestrian cross-walks, driveways or other areas where traffic needs to cross prior to proper curing of the asphalt emulsion.

8. Allow the asphalt emulsion sufficient time to cure before permitting traffic to drive on it. The curing time will depend on environmental factors, such as sunlight and the humidity. However, traffic can typically be released within 30 minutes of application.

9. After completion of the chip seal, all rpms should be uncovered and cleaned.

10. Coordinate with Traffic to schedule the painting of the final markings.

11. After the new traffic lines are painted, remove all signs and traffic control devices.

Special Considerations

Planning

The distributors should be properly calibrated at minimum at the beginning of the construction season.

Make note of the existing pavement markings including the lane width. Coordinate with Traffic to ensure proper lane widths are striped to prevent edge deterioration.

Ensure that Customer Service, the PIO, Traffic, etc. are notified when the work plans are built, 14 calendar days prior to the start of the job and after completion of the job.

Ensure that the fog seal is entered into CARS for the duration of the job.

ACTIVITY	Mainline Fog Seal	CODE	2051

Special Considerations (continued)

Planning

A **minimum** of 2 days should elapse from the end of the chip seal to the start of the fog seal to allow for proper initially curing of the asphalt emulsion.

If fog sealing shoulders, ensure that no weeds are present in the cracks. If weeds are present, spray with herbicide approximately 30 days prior to the start of the fog seal. This activity should be reported to either Activity 2230 – Herbicide Spot Treatment, Sub-Activity 32 Crack Spraying or Activity 2231 – Herbicide Broadcast Treatment, Sub-Activity 32 Crack Spraying, whichever is appropriate. It is also preferred to sweep the shoulder prior to the fog seal to remove any excess buildup that could possibly slow the operation.

Construction

The pavement must be dry with no rain expected for at least 24 hours.

The pavement temperature and ambient air temperature should be **above** 60°F.

The asphalt emulsion **should be delivered** between 140°F and 185°F. The temperature should be taken at the time of delivery from the vendor's tanker. See material specifications for rejection or penalty range.

The overlap application method is recommended on the centerline in both directions.

Self-propelled brooms should minimize down pressure that can displace embedded aggregate.

Streaks in the fog seal indicate either clogged nozzles or an improper overlap of spray from adjacent nozzles. Any streaking should be corrected prior to proceeding with the fog seal operation.

Traffic should not be allowed on the fog seal until after the asphalt emulsion no longer tracks. This is typically 30 minutes but is heavily dependent on the weather conditions.

The correct nozzles should be used when fog sealing. (Etnyre Part #3353788)

APPROVED BY

Director, Highway Maintenance

Average Daily Production	10 LNM – Lane Miles	EFFECTIVE DATE	October 1, 2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Mainline Crack Filling	CODE	2070

Purpose

Clean and fill cracks and joints with hot-poured sealant in asphalt pavement to reduce the infiltration of water and prevent incompressible materials from entering the crack. Crack filling is often considered a short-term treatment to help preserve the pavement between major maintenance operations or until a scheduled rehabilitation activity.

Category Roadway/Drainage

- ☒ **PM**
- ☒ **QA**
- ☒ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

Perform on the mainline in areas where cracks are beginning to develop or in areas scheduled for a seal coat surface treatment to prevent the infiltration of water and incompressibles. Cracks with low to moderate (less than 50% of crack length) edge deterioration should be filled. Cracks greater than 1 ½ inches should be considered for another treatment. Work should be scheduled during the non-winter months (March-November) due to temperature constraints with the material. Coordinate with District Traffic when pavement markings will be covered.

Reporting | **Reporting Units** Lane Miles

Accomplishment shall be reported in LNM - Lane Miles.

Each road should be completed on one work order with multiple day cards.

Crack filling on shoulders < 4 feet wide should be reported to this activity and performed in conjunction with mainline; crack filling on shoulders > 4 feet wide should be reported to Activity 2071 and performed separately.

Single, transverse cracks over composite pavement should be routed, sealed and reported to Activity 2090.

All work, including taping of pavement markings, should be reported to 2070.

Crew Size 4 - 8 Workers

	QTY
Air Compressor Operator	1 – 2
Hot Air Lance Operator (Optional)	1
Hot Poured Sealant Melter/ Applicator Operator (Double Boiler)	2 – 3
Laborer	1 – 2

Note: Traffic Control Personnel are NOT shown here

Job Specific Equipment

	QTY
Air Compressor	1
Hot Air Lance (Optional)	1
Hot Poured Sealant Melter/ Applicator Operator (Double Boiler)	1
Dump Truck	1 – 2
Squeegee (See Special Considerations)	1 – 2

Note: Traffic Control Equipment is NOT shown here

P.P.E.

1) Base P.P.E.

Materials

Hot Poured Sealant/ASTM 6690 Type II (LB - Pound)
INDOT Spec Section 906.02

Other References

Treatment Guidelines for Pavement Preservation Section 2.1.1 “Crack Sealing/Routing and Filling”

INDOT Spec Section 408

Sub Activities

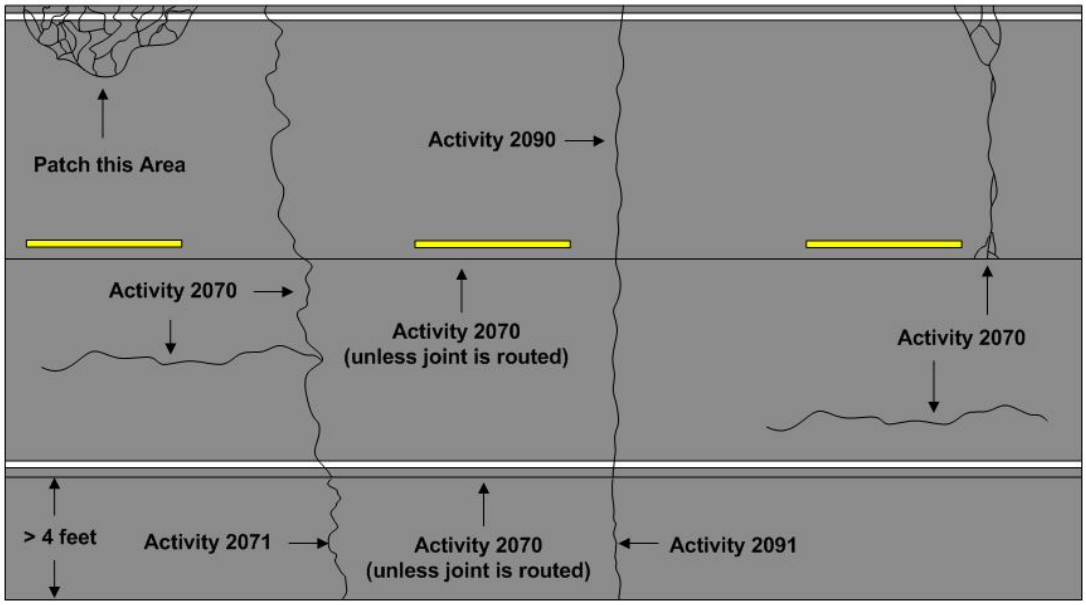
Average Daily Production	3 LNM – Lane Miles	EFFECTIVE DATE	July 1, 2016

ACTIVITY	Mainline Crack Filling	CODE	2070

Work Method

1. Place signs and safety devices.

2. Use an air compressor (or hot air lance) to thoroughly clean the crack. The cracks should be free of debris and moisture to a depth of at least twice to width of the crack. **Prior to applying the hot poured joint sealant, all cracks should be clean and dry with ambient and pavement temperatures ≥ 40°F.** This procedure is critical to avoid a loss of adhesion between the sealant and cracks.



Composite Pavement

3. Cracks should be filled with sealant from the bottom to avoid trapped air bubbles which will weaken the seal.

4. Squeegee the sealant into the cracks and surface voids. Avoid using excess material and **limit overbanding to < 5 inches**. If material tracking is a concern, lightly spray the sealant with soapy water or an anti-tracking solution to act as a bond breaker between the sealant and vehicle tires.

Overband Width

5. Remove all signs and safety devices.

ACTIVITY	Mainline Crack Filling	CODE	2070

Special Considerations

Cracks should be filled unless the crack is a single, transverse crack on composite pavement, which is an asphalt surface over a concrete base. Longitudinal joints should be filled unless routing is needed. If routing is needed, then the work should be reported to Activity 2090 – Mainline Crack Route and Seal or Activity 2091 – Shoulder Crack Route and Seal. Step #2 of the work method should clarify what types of cracks need to be filled versus routed and sealed.

All cracks should be filled with hot poured sealant. However, if a road is scheduled to be chip sealed in either the current fiscal year or the next fiscal year, only the cracks ≥ ¼" should be filled.

If pavement markings will be affected from the crack filling, cover them with temporary tape to protect them during application and remove the temporary tape after the road has been filled. If covering the pavement markings with hot poured sealant can't be avoided (crack is through the pavement marking), coordinate with District Traffic to paint the traffic markings after the crack filling operation is complete.

The pavement must be dry and all joints should be free of moisture.

The pavement and air temperature should be at least 40°F. **Sealant should never be applied when the temperature is below freezing.**

Sealant should never be heated for more than 12 hours. Segregation will occur if the material is overheated. **Continuously adding blocks as they are used will eliminate to possibility of segregation.** Plan accordingly based on the workload when adding blocks of sealant to the melter. **When placing blocks of sealant in the melter, the exterior of the blocks should be free of debris, which can damage the pump or plug the wand.**

Periodically check for joint cleanliness and moisture. If the joint is not clean, blow compressed air in the joint again. If the joints have moisture present, use hot air blasting to adequately dry them. If hot air blasting is not available, suspend the operation for a later date when the pavement conditions are acceptable.

Straight squeegees should not be used due to wide overbanding issues. Only "U" shaped and "V" shaped squeegees should be used.

Attachments are available for the hot poured sealant melters, such as the Crafco Brand "Super Shot Drip Stopper", which can be used to eliminate excess sealant from leaving the applicator wand once the trigger is released. The Crafco Brand "Swivel Adapter" can be used to eliminate the use of a squeegee on the operation.

Cracks should be cleaned using an air compressor using no less than 70 cfm at 100 psi. **Leaf blowers are not permitted.**

Hot air lance usage is optional. A hot air lance will improve the adhesion of the sealant material. However, extra attention should be given to ensure the pavement does not get damaged from the hot air lance. Prior to any usage of a hot air lance, ensure there is adequate training for all operators.

Sealant temperature is critical to a successful job. Sealant should be stored, handled and heated to the manufacturer's specifications. The application temperature should be between 350°F and 400°F with the recommended temperature between **370°F and 390°F**. The maximum temperature should **never exceed 400°F**. The heat transfer oil should be 500°F to properly melt the sealant but should never exceed 525°F.

The hot poured joint sealant melter/applicator should be kept at least ⅓ full at all times to help maintain temperature uniformity. The hot poured joint sealant should be continuously agitated except when new material is being added.

At the end of the day, the applicator wand should be cleaned and cleared of any residual material.

	APPROVED BY
	Director, Highway Maintenance

Average Daily Production	3 LNM – Lane Miles	EFFECTIVE DATE	July 1, 2016

INDIANA DEPARTMENT OF TRANSPORTATION (INDOT)

Activity 2070 - Crack Fill Quality Assurance Evaluation

District/ Sub district: _____ **Evaluation Date:** _____

Location : _____ **Route:** _____ **RP Start:** _____ **End:** 500'

Date Project completed: _____ **Evaluated by:** _____

QA Type: 1 Month (initial) **Final Score:** 0%

OBSERVATIONS:

1 Percentage Cracks filled

0 < 85 %
8 85 % - 99 %
15 100%

	S1	S2	Avg
Points:	**0.00**	**0.00**	**0.0**

2 Overband Width (Majority)

0 > 5"
15 < 5 "

	S1	S2	Avg
Points:	**0.00**	**0.00**	**0.0**

3 Special Markings

Deficiency equals where over 1/4 of the marking is covered

0 Significant coverage
5 No Coverage

	S1	S2	Avg
Points:	**0.00**	**0.00**	**0.0**

4 Traffic Edge/Centerline Obscured

Deficiency equals each dontinuous 10' section of longitudinal line where over 3/4 of the line width is covered

0 > 5 Deficiencies
3 4 to 5 Deficiencies
7 1 to 3 Deficiencies
10 No deficiencies

	S1	S2	Avg
Points:	**0.00**	**0.00**	**0.0**

5 Tracking Disregard tracking from filling operation equipment

0 Significant tracking
3 Minor tracking
5 No tracking

	S1	S2	Avg
Points:	**0.00**	**0.00**	**0.0**

cont.2

Activity 2070 - Crack Fill Quality Assurance Evaluation

Page 2

Judgment of Evaluator (Evaluator's Comments Required) **continue**

TOTAL POINTS:

Observation #		1	2	3	4	5
Points	50	15	15	5	10	5

Rev 6-13

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Shoulder Crack Filling	CODE	2071

Purpose

Clean and fill cracks and joints with hot-poured sealant in asphalt pavement to reduce the infiltration of water and prevent incompressible materials from entering the crack. Crack filling is often considered a short-term treatment to help preserve the pavement between major maintenance operations or until a scheduled rehabilitation activity.

Category Roadway/Drainage

- ☒ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

Perform on the mainline in areas where cracks are beginning to develop or in areas scheduled for a seal coat surface treatment to prevent the infiltration of water and incompressibles. Cracks with low to moderate (less than 50% of crack length) edge deterioration should be filled. Cracks greater than 1 ½ inches should be considered for another treatment. Work should be scheduled during the non-winter months (March-November) due to temperature constraints with the material. Coordinate with District Traffic when pavement markings will be covered.

Reporting | **Reporting Units** Foot Miles

Accomplishment shall be reported in FTM - Foot Miles.

FTM (Foot Miles) is equal to the width of the shoulder (feet) x length of miles completed (miles)

Each road should be completed on one work order with multiple day cards.

Crack filling on shoulders < 4 feet wide should be reported to this activity and performed in conjunction with mainline; crack filling on shoulders > 4 feet wide should be reported to Activity 2071 and performed separately.

Single, transverse cracks over composite pavement shoulders should be routed, sealed and reported to Activity 2091.

All work, including taping of pavement markings, should be reported to 2071.

Crew Size 4 - 8 Workers

	QTY
Air Compressor Operator	1 – 2
Hot Air Lance Operator (Optional)	1
Hot Poured Sealant Melter/ Applicator Operator (Double Boiler)	2 – 3
Laborer	1 – 2

Note: Traffic Control Personnel are NOT shown here

Job Specific Equipment

	QTY
Air Compressor	1
Hot Air Lance (Optional)	1
Hot Poured Sealant Melter/ Applicator Operator (Double Boiler)	1
Dump Truck	1 – 2
Squeegee (See Special Considerations)	1 – 2

Note: Traffic Control Equipment is NOT shown here

P.P.E.

1) Base P.P.E.

Materials

Hot Poured Sealant/ASTM 6690 Type II (LB - Pound)
INDOT Spec Section 906.02

Other References

Treatment Guidelines for Pavement Preservation Section 2.1.1 “Crack Sealing/Routing and Filling”

INDOT Spec Section 408

Sub Activities

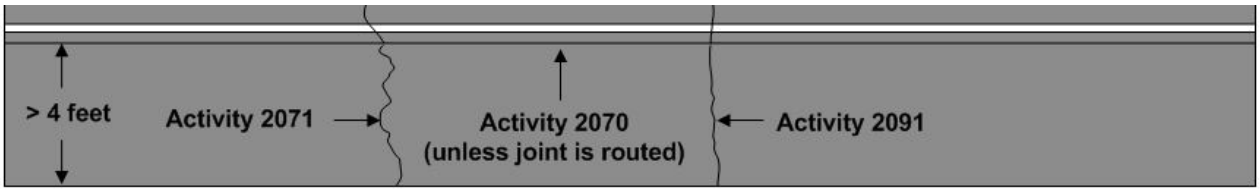
Average Daily Production	44 FTM – Foot Miles	EFFECTIVE DATE	October 1, 2015

ACTIVITY	Shoulder Crack Filling	CODE	2071

Work Method

1. Place signs and safety devices.

2. Use an air compressor (or hot air lance) to thoroughly clean the crack. The cracks should be free of debris and moisture to a depth of at least twice to width of the crack. **Prior to applying the hot poured joint sealant, all cracks should be clean and dry with an ambient and pavement temperatures ≥ 40°F.** This procedure is critical to avoid a loss of adhesion between the sealant and cracks.



Composite Pavement

3. Cracks should be filled with sealant from the bottom to avoid trapped air bubbles which will weaken the seal.

4. Squeegee the sealant into the cracks and surface voids. Avoid using excess material and **limit overbanding to < 5 inches**. If material tracking is a concern, lightly spray the sealant with soapy water or an anti-tracking solution to act as a bond breaker between the sealant and vehicle tires.

Overband Width

5. Remove all signs and safety devices.

ACTIVITY	Shoulder Crack Filling	CODE	2071

Special Considerations

Cracks should be filled unless the crack is a single, transverse crack on composite pavement, which is an asphalt surface over a concrete base. Longitudinal joints should be filled unless routing is needed. If routing is needed, then the work should be reported to Activity 2090 – Mainline Crack Route and Seal or Activity 2091 – Shoulder Crack Route and Seal. Step #2 of the work method should clarify what types of cracks need to be filled versus routed and sealed.

All cracks should be filled with hot poured sealant. However, if a road is scheduled to be chip sealed in either the current fiscal year or the next fiscal year, only the cracks ≥ ¼" should be filled.

If pavement markings will be affected from the crack filling, cover them with temporary tape to protect them during application and remove the temporary tape after the road has been filled. If covering the pavement markings with hot poured sealant can't be avoided (crack is through the pavement marking), coordinate with District Traffic to paint the traffic markings after the crack filling operation is complete.

The pavement must be dry and all joints should be free of moisture.

The pavement and air temperature should be at least 40°F. **Sealant should never be applied when the temperature is below freezing.**

Sealant should never be heated for more than 12 hours. Segregation will occur if the material is overheated. **Continuously adding blocks as they are used will eliminate to possibility of segregation.** Plan accordingly based on the workload when adding blocks of sealant to the melter. **When placing blocks of sealant in the melter, the exterior of the blocks should be free of debris, which can damage the pump or plug the wand.**

Periodically check for joint cleanliness and moisture. If the joint is not clean, blow compressed air in the joint again. If the joints have moisture present, use hot air blasting to adequately dry them. If hot air blasting is not available, suspend the operation for a later date when the pavement conditions are acceptable.

Straight squeegees should not be used due to wide overbanding issues. Only "U" shaped and "V" shaped squeegees should be used.

Attachments are available for the hot poured sealant melters, such as the Crafco Brand "Super Shot Drip Stopper", which can be used to eliminate excess sealant from leaving the applicator wand once the trigger is released. The Crafco Brand "Swivel Adapter" can be used to eliminate the use of a squeegee on the operation.

Cracks should be cleaned using an air compressor using no less than 70 cfm at 100 psi. **Leaf blowers are not permitted.**

Hot air lance usage is optional. A hot air lance will improve the adhesion of the sealant material. However, extra attention should be given to ensure the pavement does not get damaged from the hot air lance. Prior to any usage of a hot air lance, ensure there is adequate training for all operators.

Sealant temperature is critical to a successful job. Sealant should be stored, handled and heated to the manufacturer's specifications. The application temperature should be between 350°F and 400°F with the recommended temperature between **370°F and 390°F**. The maximum temperature should **never exceed 400°F**. The heat transfer oil should be 500°F to properly melt the sealant but should never exceed 525°F.

The hot poured joint sealant melter/applicator should be kept at least ⅓ full at all times to help maintain temperature uniformity. The hot poured joint sealant should be continuously agitated except when new material is being added.

At the end of the day, the applicator wand should be cleaned and cleared of any residual material.

	APPROVED BY
	Director, Highway Maintenance

Average Daily Production	44 FTM – Foot Miles	EFFECTIVE DATE	October 1, 2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Mainline Crack Rout and Seal	CODE	2090

Purpose

Rout and seal single, transverse cracks with hot-poured sealant in composite pavement to reduce the infiltration of water and prevent incompressible materials from entering the crack. If necessary, longitudinal joints may be routed and sealed to prevent joint deterioration.

Category Roadway/Drainage

- ☒ **PM**
- ☒ **QA**
- ☒ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

Perform on the mainline in areas where cracks are beginning to develop to prevent the infiltration of water and incompressibles. Only single, transverse cracks over composite pavement with no edge deterioration should be routd and sealed. All other crack maintenance should be reported to 2070. Cracks greater than 1 ½ inches should be considered for another treatment. Work should be scheduled during the spring months (April – June) and fall months (September – November) due to the crack width and temperature constraints with the material. Coordinate with District Traffic when pavement markings will be covered.

Reporting | **Reporting Units** Lane Miles

Accomplishment is reported in LNM - Lane Miles.

Each road should be completed on one work order with multiple day cards.

Material should be reported in pounds of material used.

All work involved, including routing of the cracks or taping of pavement markings, is reported to 2090, but the only accomplishment reported is sealing the cracks and joints.

Crack routing and sealing on shoulders < 4 feet wide should be reported to this activity and performed in conjunction with mainline; crack routing and sealing on shoulders > 4 feet wide should be reported to Activity 2091 and performed separately.

All cracks that are not single, transverse cracks over composite pavement should be reported to Activity 2070.

All sealing of concrete joints should be reported to Activity 2095 – Resealing Concrete Pavement Joints. (INDOT Standard Spec 507.04(b))

Average Daily Production	3 LNM – Lane Miles	EFFECTIVE DATE	July 1, 2016

ACTIVITY	Mainline Crack Rout and Seal	CODE	2090

Crew Size — 5 – 10 Workers

	QTY
Air Compressor Operator	1 – 2
Hot Air Lance Operator (Optional)	1
Hot Poured Sealant Melter/ Applicator Operator (Double Boiler)	2 – 3
Pavement Router Operator	1 – 2
Laborer	1 – 2

Note: Traffic Control Personnel are NOT shown here

Job Specific Equipment

	QTY
Air Compressor	1
Hot Air Lance (Optional)	1
Hot Poured Sealant Melter/ Applicator Operator (Double Boiler)	1
Pavement Router	1 – 2
Dump Truck	1 – 2
Squeegee (See Special Considerations)	1 – 2

Note: Traffic Control Equipment is NOT shown here

P.P.E.

1) Base P.P.E.

Materials

Hot Poured Sealant/ASTM 6690 Type II (LB - Pound)
INDOT Spec Section 906.02

Other References

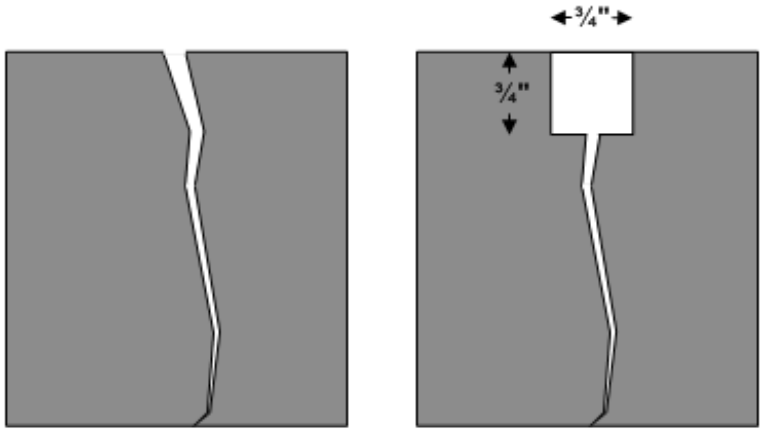
Treatment Guidelines for Pavement Preservation Section 2.1.1 “Crack Sealing/Routing and Filling”

INDOT Spec Section 408

Sub Activities

Work Method

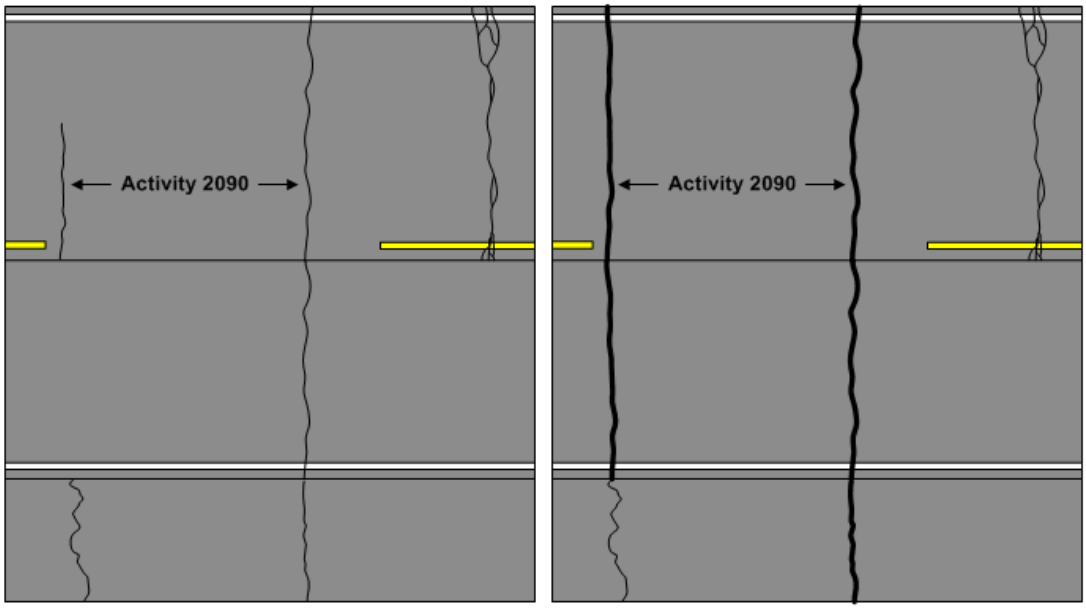
1. Place signs and safety devices.
2. Using a pavement router, rout all single, transverse cracks over composite pavement, which is an asphalt surface over a concrete base. The reservoir should be square with dimensions of ¾ " x ¾ ". If the single, transverse crack is only partially across the traffic lane, continue routing across the entire lane width.



Before Routing After Routing

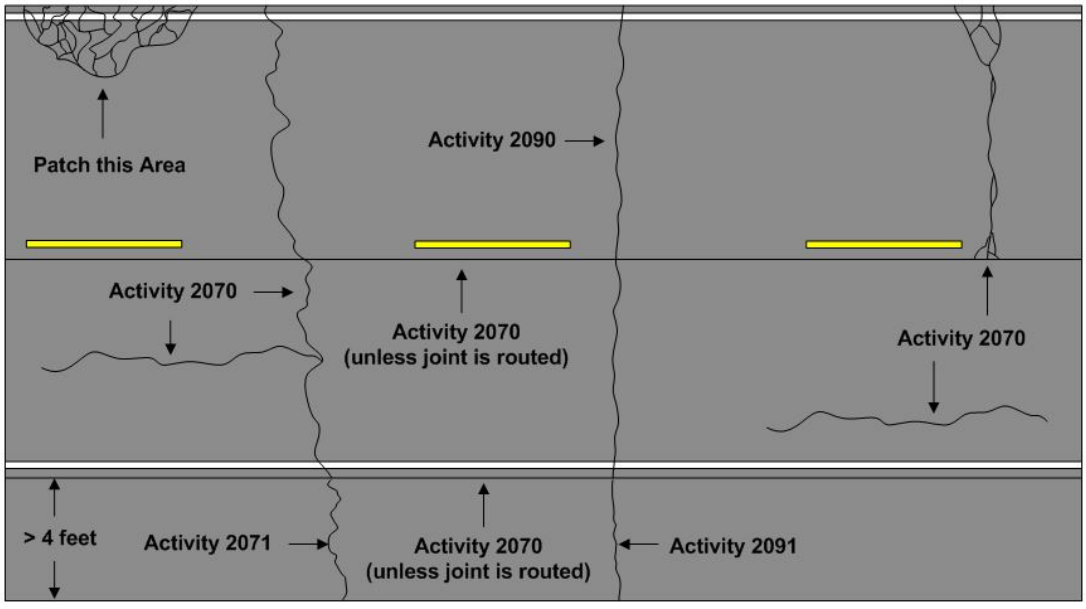
ACTIVITY	Mainline Crack Rout and Seal	CODE	2090

Work Method (continued)



Before Routing After Routing

3. Use an air compressor (or hot air lance) to thoroughly clean the crack. The cracks should be free of debris and moisture to a depth of at least twice to width of the crack. **Prior to applying the hot poured joint sealant, all cracks should be clean and dry with ambient and pavement temperatures ≥ 40°F.** This procedure is critical to avoid a loss of adhesion between the sealant and cracks.



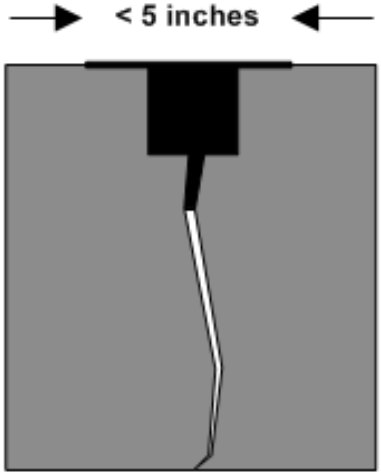
Composite Pavement

4. Cracks should be filled with sealant from the bottom to avoid trapped air bubbles which will weaken the seal.

ACTIVITY	Mainline Crack Rout and Seal	CODE	2090

Work Method (continued)

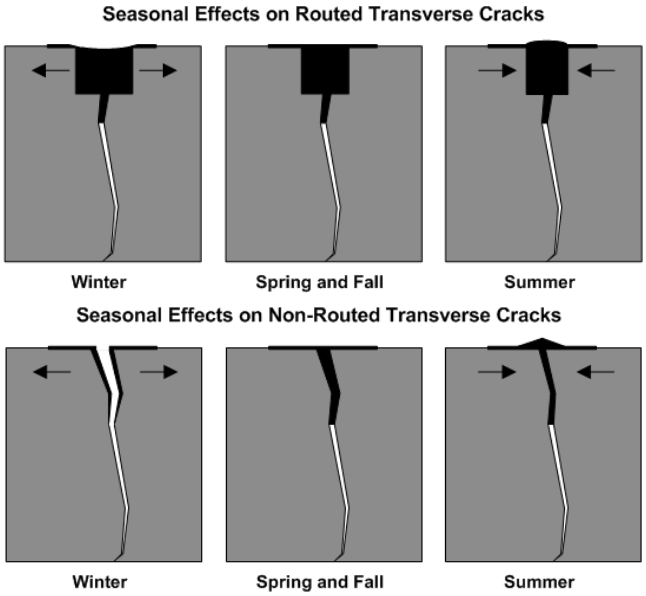
5. Squeegee the sealant into the cracks and surface voids. Avoid using excess material and **limit overbanding to < 5 inches**. If material tracking is a concern, lightly spray the sealant with soapy water or an anti-tracking solution to act as a bond breaker between the sealant and vehicle tires.



6. Remove all signs and safety devices.

Special Considerations

Only single, transverse cracks on composite pavement, which is an asphalt surface over a concrete base should be reported to Activity 2090. Longitudinal joints should be reported only if routing is needed. Step #3 of the work method should clarify what types of cracks need to be filled versus routed and sealed.



ACTIVITY	Mainline Crack Rout and Seal	CODE	2090

Special Considerations (continued)

If pavement markings will be affected by the crack rout and seal, cover them with temporary tape to protect them during application and remove the temporary tape after the road has been sealed. If covering the pavement markings with hot poured sealant can't be avoided (crack is through the pavement marking), coordinate with District Traffic to paint the traffic markings after the crack filling operation is complete.

The pavement must be dry and all joints should be free of moisture.

The pavement and air temperature should be at least 40°F. **Sealant should never be applied when the temperature is below freezing.**

Cracks should be sealed the same day they are routed. **However, no more than 3 calendar days should pass before the cracks are sealed.**

Routed cracks should be periodically checked for routed dimension. Routed cracks should have square sides with a flat bottom. If the routed crack is not square but rounded, the carbide cutters should be replaced. Typically, carbide cutters should last for 17,000 to 24,000 LF (linear feet), which will vary depending on the pavement type.

Sealant should never be heated for more than 12 hours. Segregation will occur if the material is overheated. **Continuously adding blocks as they are used will eliminate to possibility of segregation.** Plan accordingly based on the workload when adding blocks of sealant to the melter. **When placing blocks of sealant in the melter, the exterior of the blocks should be free of debris, which can damage the pump or plug the wand.**

Periodically check for joint cleanliness and moisture. If the joint is not clean, blow compressed air in the joint again. If the joints have moisture present, use hot air blasting to adequately dry them. If hot air blasting is not available, suspend the operation for a later date when the pavement conditions are acceptable.

Straight squeegees should not be used due to wide overbanding issues. Only "U" shaped and "V" shaped squeegees should be used.

Attachments are available for the hot poured sealant melters, such as the Crafco Brand "Super Shot Drip Stopper", which can be used to eliminate excess sealant from leaving the applicator wand once the trigger is released. The Crafco Brand "Swivel Adapter" can be used to eliminate the use of a squeegee on the operation.

Cracks should be cleaned using an air compressor using no less than 70 cfm at 100 psi. **Leaf blowers are not permitted.**

Hot air lance usage is optional. A hot air lance will improve the adhesion of the sealant material. However, extra attention should be given to ensure the pavement does not get damaged from the hot air lance. Prior to any usage of a hot air lance, ensure there is adequate training for all operators.

Sealant temperature is critical to a successful job. Sealant should be stored, handled and heated to the manufacturer's specifications. The application temperature should be between 350°F and 400°F with the recommended temperature between **370°F and 390°F**. The maximum temperature should **never exceed 400°F**. The heat transfer oil should be 500°F to properly melt the sealant but should never exceed 525°F.

The hot poured joint sealant melter/applicator should be kept at least ⅓ full at all times to help maintain temperature uniformity. The hot poured joint sealant should be continuously agitated except when new material is being added.

At the end of the day, the applicator wand should be cleaned and cleared of any residual material.

	APPROVED BY
	Director, Highway Maintenance

Average Daily Production	3 LNM – Lane Miles	EFFECTIVE DATE	July 1, 2016

INDIANA DEPARTMENT OF TRANSPORTATION (INDOT)

Activity 2090 - Mainline Crack Route/Seal Quality Assurance Evaluation

District/ Sub district: _____ **Evaluation Date:** _____

WMS Location Code: _____ **Route:** _____ **RP Start:** _____ **End:** 500'/500'

Date Project completed: _____ **Evaluated by:** _____

QA Type: 1 Month (initial) 12 Month (follow-up) **Final Score:** 0%

OBSERVATIONS:

Follow up: 0%

1 Routing **Not required if crack is open 1/2 inch**

0 No routing
25 Cracking not all routed
40 Crack/ Joint routed to >= 1/2"

	S1	S2	Avg
Points:	0	0	**0**

2 Fill Depth

0 No sealant in crack or above surface
2 Crack over banded > 5"
6 Sealed more than 1/2" below or above surface
10 Sealed to within 1/4" below surface (no over band or over band <5")

	S1	S2	Avg
Points:	0	0	**0**

3 Percentage of Cracks Sealed

Crack's length must be completely sealed, to count.

0 < 85 %
10 85 % < 99 %
15 100%

	S1	S2	Avg
Points:	0	0	**0**

4 Material Adherence (ONLY item for 12 month evaluation)

Deficiency: material either pulled away from edges, or is not well bonded

0 < 85 %
5 85 % < 99 %
10 100%

	S1	S2	Avg
Points:	0	0	**0**
Follow up	0	0	**0**

5 Tracking **No loss in points if caused by sealing equipment**

0 Major tracking, material pulling out of crack
3 Minor tracking, material still in crack
5 No evidence of tracking

	S1	S2	Avg
Points:	0	0	**0**

cont.2

Activity 2090 - Mainline Crack Route/Seal Quality Assurance Evaluation
Page 2

Judgment of Evaluator (Evaluator's Comments Required) **continue**

TOTAL POINTS:

Intial Observations *(1 Month)*

Observation #	1	2	3	4	5	Total
Available Points	40	10	15	10	5	**80**
Average QA Scored	0	0	0	0	0	**0**

Follow-Up Observations *(1 Year)*

Observation #	4	Total
Available Points	10	
Average QA Scored	0	**0**

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Shoulder Crack Route and Seal	CODE	2091

Purpose

Route and seal single, transverse cracks with hot-poured sealant in composite pavement shoulders to reduce the infiltration of water and prevent incompressible materials from entering the crack. If necessary, longitudinal joints may be routed and sealed to prevent joint deterioration.

Category Roadway/Drainage

- ☒ **PM**
- ☒ **QA**
- ☒ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

Perform on shoulders greater than 4 feet in width in areas where cracks are beginning to develop to prevent the infiltration of water and incompressibles. Only single, transverse cracks over composite pavement shoulders with no edge deterioration should be routed and sealed. All other crack maintenance should be reported to 2070. Cracks greater than 1 ½ inches should be considered for another treatment. Work should be scheduled during the spring months (April – June) and fall months (September – November) due to the crack width and temperature constraints with the material. Coordinate with District Traffic when pavement markings will be covered.

Reporting — **Reporting Units** Foot Miles

Accomplishment is reported in FTM - Foot Miles.

FTM (Foot Miles) is equal to the width of the shoulder (feet) x length of miles completed (miles)

Each road should be completed on one work order with multiple day cards.

Material should be reported in pounds of material used.

All work involved, including routing of the cracks or taping of pavement markings, is reported to 2091, but the only accomplishment reported is sealing the cracks and joints.

Crack routing and sealing on shoulders < 4 feet wide should be reported to this activity and performed in conjunction with mainline; crack routing and sealing on shoulders > 4 feet wide should be reported to Activity 2091 and performed separately.

All cracks that are not single, transverse cracks over composite pavement should be reported to Activity 2071.

All sealing of concrete joints should be reported to Activity 2095 – Resealing Concrete Pavement Joints. (INDOT Standard Spec 507.04(b))

Average Daily Production	33 FTM – Foot Miles	EFFECTIVE DATE	October 1, 2015

ACTIVITY	Shoulder Crack Route and Seal	CODE	2091

Crew Size — 5 – 10 Workers

	QTY
Air Compressor Operator	1 – 2
Hot Air Lance Operator (Optional)	1
Hot Poured Sealant Melter/ Applicator Operator (Double Boiler)	2 – 3
Pavement Router Operator	1 – 2
Laborer	1 – 2

Note: Traffic Control Personnel are NOT shown here

Job Specific Equipment

	QTY
Air Compressor	1
Hot Air Lance (Optional)	1
Hot Poured Sealant Melter/ Applicator Operator (Double Boiler)	1
Pavement Router	1 – 2
Dump Truck	1 – 2
Squeegee (See Special Considerations)	1 – 2

Note: Traffic Control Equipment is NOT shown here

P.P.E.

1) Base P.P.E.

Materials

Hot Poured Sealant/ASTM 6690 Type II (LB - Pound)
INDOT Spec Section 906.02

Other References

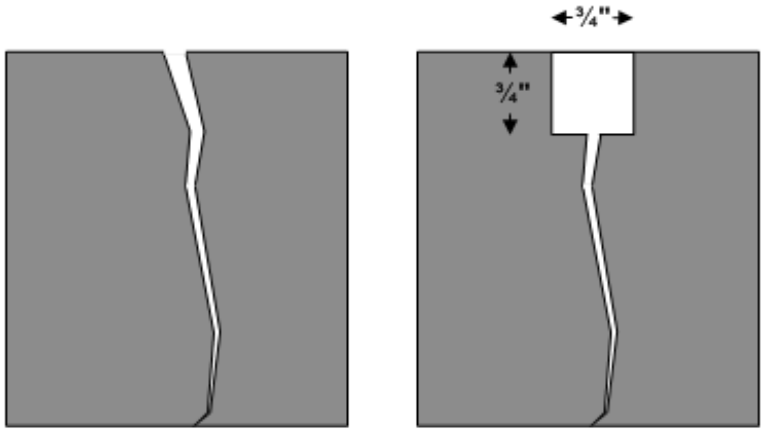
Treatment Guidelines for Pavement Preservation Section 2.1.1 “Crack Sealing/Routing and Filling”

INDOT Spec Section 408

Sub Activities

Work Method

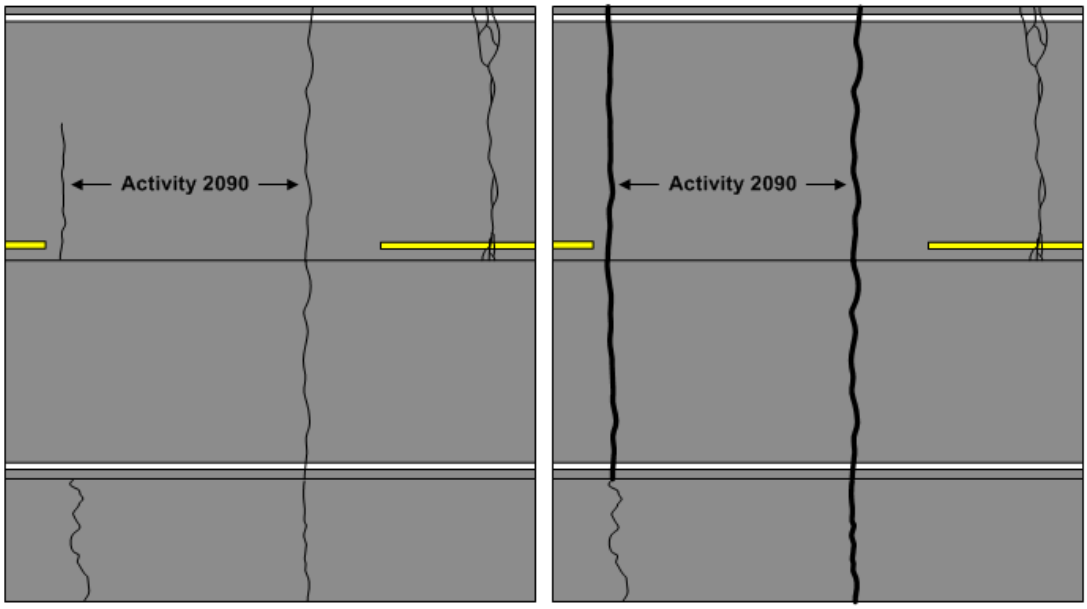
1. Place signs and safety devices.
2. Using a pavement router, route all single, transverse cracks over composite pavement, which is an asphalt surface over a concrete base. The reservoir should be square with dimensions of ¾ " x ¾ ". If the single, transverse crack is only partially across the shoulder, continue routing across the entire shoulder width.



Before Routing After Routing

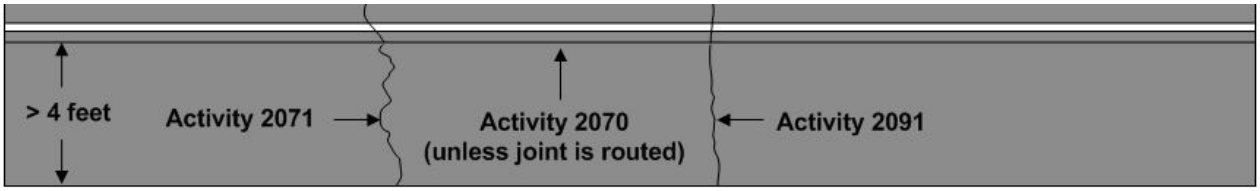
ACTIVITY	Shoulder Crack Route and Seal	CODE	2091

Work Method (continued)



Before Routing After Routing

3. Use an air compressor (or hot air lance) to thoroughly clean the crack. The cracks should be free of debris and moisture to a depth of at least twice to width of the crack. **Prior to applying the hot poured joint sealant, all cracks should be clean and dry with an ambient and pavement temperatures ≥ 40°F.** This procedure is critical to avoid a loss of adhesion between the sealant and cracks.



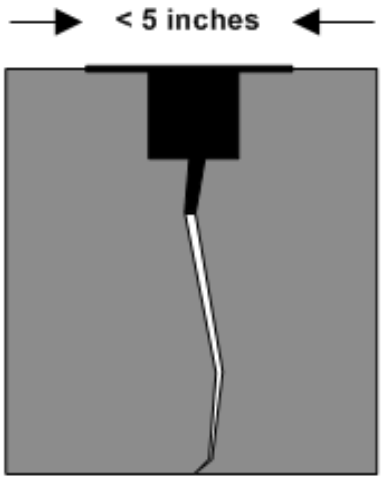
Composite Pavement

4. Cracks should be filled with sealant from the bottom to avoid trapped air bubbles which will weaken the seal.

5. Squeegee the sealant into the cracks and surface voids. Avoid using excess material and **limit overbanding to < 5 inches**. If material tracking is a concern, lightly spray the sealant with soapy water or an anti-tracking solution to act as a bond breaker between the sealant and vehicle tires.

ACTIVITY	Shoulder Crack Route and Seal	CODE	2091

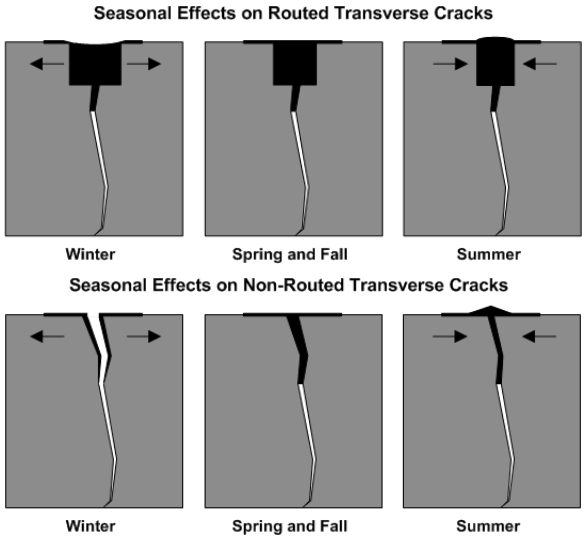
Work Method (continued)



6. Remove all signs and safety devices.

Special Considerations

Only single, transverse cracks on composite pavement, which is an asphalt surface over a concrete base, should be reported to Activity 2091. Longitudinal joints should be reported only if routing is needed. Step #3 of the work method should clarify what types of cracks need to be filled versus routed and sealed.



ACTIVITY	Shoulder Crack Route and Seal	CODE	2091

Special Considerations (continued)

If pavement markings will be affected by the crack route and seal, cover them with temporary tape to protect them during application and remove the temporary tape after the road has been sealed. If covering the pavement markings with hot poured sealant can't be avoided (crack is through the pavement marking), coordinate with District Traffic to paint the traffic markings after the crack filling operation is complete.

The pavement must be dry and all joints should be free of moisture.

The pavement and air temperature should be at least 40°F. **Sealant should never be applied when the temperature is below freezing.**

Cracks should be sealed the same day they are routed. **However, no more than 3 calendar days should pass before the cracks are sealed.**

Routed cracks should be periodically checked for routed dimension. Routed cracks should have square sides with a flat bottom. If the routed crack is not square but rounded, the carbide cutters should be replaced. Typically, carbide cutters should last for 17,000 to 24,000 LF (linear feet), which will vary depending on the pavement type.

Sealant should never be heated for more than 12 hours. Segregation will occur if the material is overheated. **Continuously adding blocks as they are used will eliminate to possibility of segregation.** Plan accordingly based on the workload when adding blocks of sealant to the melter. **When placing blocks of sealant in the melter, the exterior of the blocks should be free of debris, which can damage the pump or plug the wand.**

Periodically check for joint cleanliness and moisture. If the joint is not clean, blow compressed air in the joint again. If the joints have moisture present, use hot air blasting to adequately dry them. If hot air blasting is not available, suspend the operation for a later date when the pavement conditions are acceptable.

Straight squeegees should not be used due to wide overbanding issues. Only "U" shaped and "V" shaped squeegees should be used.

Attachments are available for the hot poured sealant melters, such as the Crafco Brand "Super Shot Drip Stopper", which can be used to eliminate excess sealant from leaving the applicator wand once the trigger is released. The Crafco Brand "Swivel Adapter" can be used to eliminate the use of a squeegee on the operation.

Cracks should be cleaned using an air compressor using no less than 70 cfm at 100 psi. **Leaf blowers are not permitted.**

Hot air lance usage is optional. A hot air lance will improve the adhesion of the sealant material. However, extra attention should be given to ensure the pavement does not get damaged from the hot air lance. Prior to any usage of a hot air lance, ensure there is adequate training for all operators.

Sealant temperature is critical to a successful job. Sealant should be stored, handled and heated to the manufacturer's specifications. The application temperature should be between 350°F and 400°F with the recommended temperature between **370°F and 390°F**. The maximum temperature should **never exceed 400°F**. The heat transfer oil should be 500°F to properly melt the sealant but should never exceed 525°F.

The hot poured joint sealant melter/applicator should be kept at least ⅓ full at all times to help maintain temperature uniformity. The hot poured joint sealant should be continuously agitated except when new material is being added.

At the end of the day, the applicator wand should be cleaned and cleared of any residual material.

		APPROVED BY	
		Director, Highway Maintenance	
Average Daily Production	**33 LNM – Lane Miles**	**EFFECTIVE DATE**	October 1, 2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Resealing Concrete Pavement Joints	CODE	2095

Purpose

Resealing the concrete pavement joints helps to reduce the amount of water infiltrating the pavement as well as prevent incompressible material from filling the joints. Water infiltration can lead to defects such as pumping and faulting, while incompressible material can cause joint spalling and blowups. Resealing the joints should include removal of any backer rod material.

Category Roadway/Drainage

- ☒ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

Perform on mainline areas where the joint filler is broken, brittle or missing that allows entry of water and incompressible materials. This work should be scheduled in the Spring or Fall months. Coordinate with District Traffic when pavement markings will be covered.

Reporting | **Reporting Units** Lane Miles

Accomplishment is reported in LNM - Lane Miles.

Material should be reported in pounds of material used.

Removal of the backer rod only should be reported as zero accomplishment.

This activity is for resealing concrete pavement joints only. All sealing of concrete cracks should be reported to Activity 2090 – Mainline Crack Route and Seal. (INDOT Standard Spec 507.03(a))

Crew Size 4 – 5 Workers

	QTY
Air Compressor Operator	1
Hot Poured Sealant Melter/ Applicator Operator (Double Boiler)	1
Laborer	2 – 3

Note: Traffic Control Personnel are NOT shown here

Job Specific Equipment

	QTY
Air Compressor	1
Hot Poured Sealant Melter/ Applicator (Double Boiler)	1
Backer Rod Removal Tool	1 – 2

Note: Traffic Control Equipment is NOT shown here

P.P.E.

1) Base P.P.E.

Materials

Hot Poured Joint Sealant (LB – Pound)
INDOT Spec Section 906.02

Other References

Treatment Guidelines for Pavement Preservation Section 2.2.2 “PCCP Joint Resealing”

INDOT Standard Specification Section 503.05, 507.04(b)

FHWA-RD-99-137 “Resealing Concrete Pavement Joints”

Sub Activities

Average Daily Production	3 LNM – Lane Miles	EFFECTIVE DATE	October 1, 2015

ACTIVITY	Resealing Concrete Pavement Joints	CODE	2095

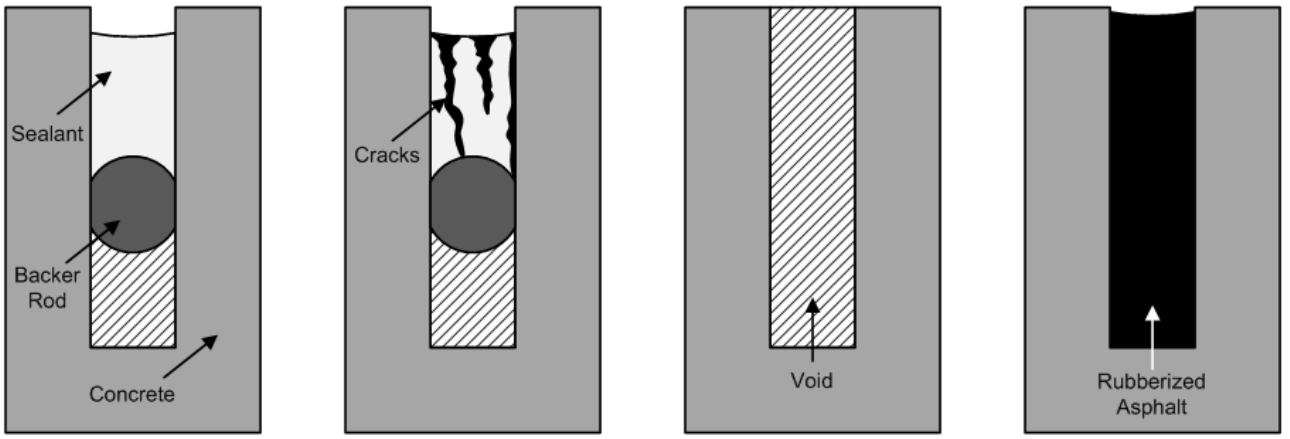
Work Method

1. Place signs and safety devices.

2. Remove the old sealant and backer rod from the joint.

3. Clean the joint with high pressure air from an air compressor or hot air blasting using a hot air lance. Do **NOT** use a leaf blower to clean out the joints. All loose dirt and debris should be blown off the edge of the roadway away from traffic.

4. Fill the joint using a specialized tip with hot poured joint sealant from the bottom up to avoid any voids due to air bubbles. Fill with sealant to within ¼" of the surface. **DO NOT OVERFILL.**



5. Spray a water/detergent mixture or anti-tracking solution with a handheld sprayer to minimize tracking of the sealant. Allow sufficient time, typically 15 to 30 minutes, for the sealant to cure before opening to traffic.

6. Remove all signs and safety devices.

Special Considerations

The pavement must be dry and all joints should be free of moisture.

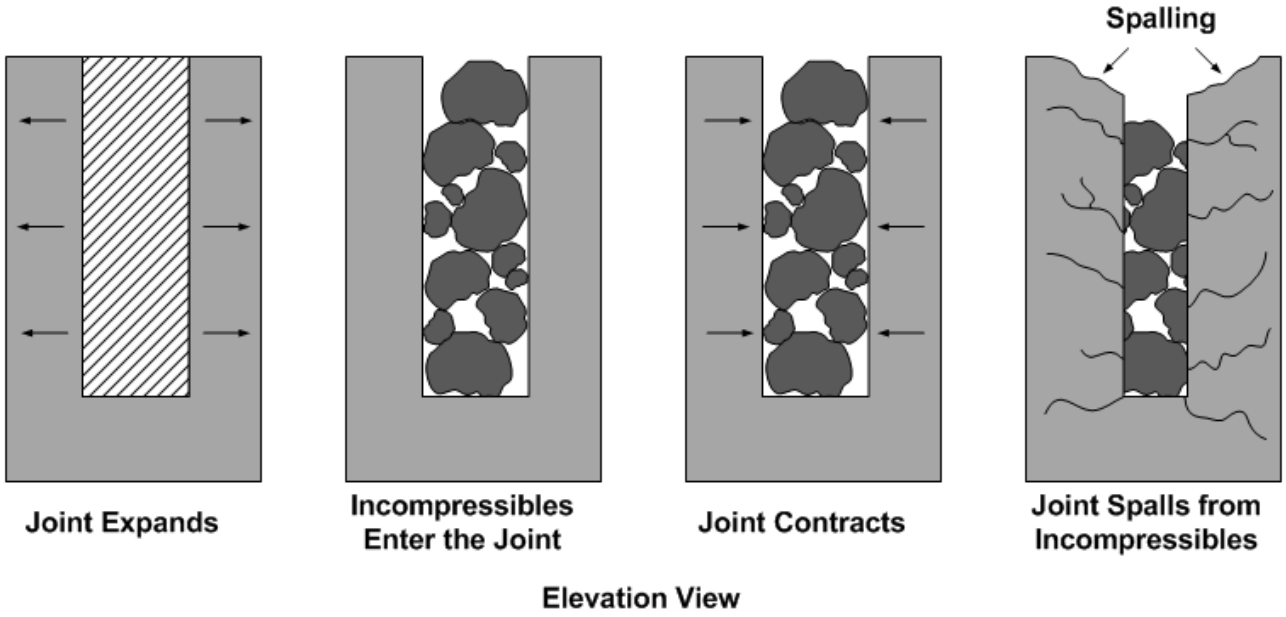
The pavement and air temperature should be at least 40°F and the pavement temperature should not exceed 135°F.

The joint cleaning operation should take place immediately in front of the joint resealing operation to maintain the cleanliness of the joints. If joints are not sealed on the same day the old sealant and backer rod are removed, then the joints should be cleaned again when the operation continues. All joints should be sealed **within 3 days** after the original sealant and backer rod being removed.

Periodically check for joint cleanliness and moisture. If the joint is not clean, blow compressed air in the joint again. If the joints have moisture present, use hot air blasting to adequately dry them. If hot air blasting is not available, suspend the operation for a later date when the pavement conditions are acceptable.

ACTIVITY	Resealing Concrete Pavement Joints	CODE	2095

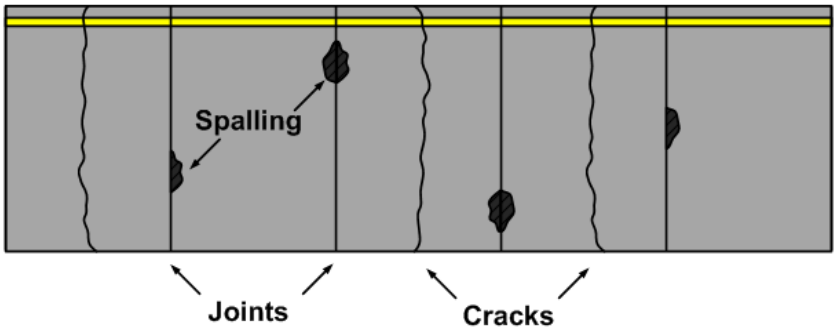
Special Considerations (continued)



Sealant temperature is critical to a successful job. Sealant should be stored, handled and heated to the manufacturer's specifications. The application temperature should be between 350°F and 400°F with the recommended temperature between **370°F and 390°F**. The maximum temperature should **never exceed 400°F**.

The hot poured joint sealant melter/applicator should be kept at least ⅓ full at all times to help maintain temperature uniformity. The hot poured joint sealant should be continuously agitated except when new material is being added.

At the end of the day, the applicator wand should be cleaned and cleared of any residual material.



	APPROVED BY
	Director, Highway Maintenance

Average Daily Production	3 LNM – Lane Miles	EFFECTIVE DATE	October 1, 2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Spot Repair of Unpaved Shoulders	CODE	2100

Purpose

Repair small areas of shoulders no larger than one mile, by adding aggregate, reshaping and compacting to correct edge ruts, potholes, and corrugations, and to replace lost material at washouts, around mailboxes, and public road approaches.

Note: This activity is used for reporting work on any aggregate areas adjacent to a paved shoulder.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule this work throughout the year at locations where hazardous conditions have developed, due to rutting and at places where traffic goes onto the shoulder often. Repair localized edge ruts after they have become 2" deep. Recurring areas should be reported to the District and considered for more permanent repairs.

Reporting

Reporting Units Short Tons

Accomplishment shall be reported in Tons of aggregate STN (Short Ton)

Minor improvement projects should be reported to Activity 2991. Activity 2991 is used for constructing shoulders where none currently exist.

Repairs to paved shoulders should be reported to Activity 2010 (Shallow Patching) or Activity 2020 (Deep Patching), as appropriate.

If Activity 2100 Spot Repair of Unpaved Shoulders and Activity 2110 Blading shoulders(which is a continuous operation) are performed at same time, the work should be separated onto two work orders.

Any repairs greater than one mile in length should be reported to Activity 2130 (Recondition Shoulders)

Crew Size 3-5 Workers

	QTY
Tractor Operator	1
Truck Driver	1
Truck Driver/Laborer	1-3

*Traffic Control Personnel are NOT shown here

P.P.E.

Base PPE

Materials

Coarse Aggregate #53 / #73 (STN-Short Ton) INDOT Spec Section 904

Salvage material (Millings)

Job Specific Equipment

	QTY
Dump Truck	2
Pickup Truck	1
Tractor/Blade, Underbody Blade, or Snow Plow	1

*Broom (optional)

*Traffic Control Equipment are NOT shown here

Other References

Sub Activities

Average Daily Production	51 STN (Short Ton)	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Spot Repair of Unpaved Shoulders	CODE	2100

Work Method

1. Place signs and safety devices
2. Place additional material in low spots or at intervals along the shoulder
3. Blade material into low spots and shape so that shoulder slope permits drainage to ditch
4. Roll material with truck tires
5. Clean work area
6. Remove signs and safety devices

Special Considerations

Do not use bituminous mixture or material for patching unpaved shoulders.

	APPROVED BY
	Director, Highway Maintenance
Average Daily Production **51 STN (Short Ton)**	**EFFECTIVE DATE** July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Blading Shoulders	CODE	2110

Purpose

Blade and reshape shoulders to eliminate edge ruts, ridges, corrugations, and high shoulders to allow for proper road surface drainage.This activity is used to bring shoulder material back up to edge of pavement so very little material should be reported. Typically no material is hauled away or added because existing material is pulled back and reshaped.

Category Roadway/Drainage

- ☒ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

Schedule this work to take advantage of natural moisture, usually in the spring and fall. Report defects on aggregate shoulders for scheduling when the shoulder drop-off is generally more than two inches, when water ponds, or when traffic has rutted or roughened the shoulder.

Reporting

Reporting Units Shoulder Miles

Accomplishment shall be reported in Shoulder Miles.

Shoulder Miles is equal to the accomplishment in shoulder length (mi) per side of road section. For example if shoulders are repaired on both sides of a one mile section of road, then two shoulder miles of work has been accomplished

Crew Size 2-4 Workers

	QTY
Grader Operator	1-2
Equipment Operator	1-2

*Traffic Control Personnel are NOT shown here

P.P.E.

1) Base PPE

2) Respiratory Protection (1 strap dust mask - broom sweepers)

Materials

Job Specific Equipment

	QTY
Power Broom	1
Grader	1
Dump Truck/Underbody blade	1
or	
Snow Plow	
*Roller (optional)	

*Traffic Control Equipment are NOT shown here

Other References

Sub Activities

Average Daily Production	20 Shoulder Miles	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Blading Shoulders	CODE	2110

Work Method

1. Place signs and safety devices
2. Cut build-ups with grader—pull material toward roadway to pavement edge
3. Second vehicle blades material back on shoulder, making sure all low spots are filled and that shoulder slope permits drainage to ditch
4. Roll with truck tires or roller as required
5. Clean hazardous debris from road surface
6. Remove signs and other safety devices

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	20 Shoulder Miles	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Clipping Shoulders	CODE	2120

Purpose

Report major clipping of overgrown shoulders to remove excess material and to restore proper slope for adequate drainage, to this activity.Typically no material is added but excess material must be hauled away. Includes clipping of overgrown shoulders adjacent to the driving surface, sod adjacent to paved or aggregate shoulder.

Category Roadway/Drainage

- ☒ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

Perform this work on overgrown shoulders when there is more than one inch difference between the roadway surface and shoulder surface or where excess material blocks drainage from the roadway or shoulder surface. Coordinate this activity with Activity 204 Shoulder Seal Coat and Activity 205 Seal Coat. Schedule this work to take advantage of natural moisture, usually in the spring and fall.

Reporting | **Reporting Units** Shoulder Miles

Accomplishment shall be reported in Shoulder Miles.

Shoulder Miles is equal to the accomplishment in shoulder length (mi) per side of road section. For example if shoulders are repaired on both sides of a one mile section of road, then two shoulder miles of work has been accomplished

Any required ditching should be scheduled and reported to Activity 2310 Clean and Reshape Ditches

Crew Size 5-8 Workers

	QTY
Motor Grader Operator	1
Loader Operator	1
Truck Driver	3-6

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

	QTY
Motor Grader	1
Loader	1
Dump Truck	3
Power Broom	1
Water Truck	1

*Traffic Control Equipment are NOT shown here

P.P.E.

1) Base PPE

2) Respiratory Protection (1 strap dust mask - broom sweepers)

Materials

Other References

Sub Activities

Average Daily Production	6 Shoulder Miles	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Clipping Shoulders	CODE	2120

Work Method

1. Place signs and safety devices
2. Cut excess material off shoulder with grader with first pass.
   Second pass windrow excess material along pavement edge.
   Third and Fourth passes, smooth material to original grade and slope as necessary to obtain proper drainage to ditch
3. Load excess material into trucks and dump at designated area.
5. Sweep loose material off pavement surface with power broom
6. Compact loose shoulder material with truck tires
7. Remove signs and safety devices

Special Considerations

Clipped roadside debris must be removed during the performance of this activity.
When disposing of waste material off of state property, utilize the "Excavation Material Disposal Site" form with Activity 2310.
High cost activity.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	6 Shoulder Miles	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Recondition Shoulders	CODE	2130

Purpose

Restore the shoulder grade and surface, through reconditioning continuous shoulder sections by adding aggregate, reshaping, and compacting.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

Rebuild shoulder where the drop off exceeds 2” for extended lengths as a result of repeated grading and loss of material. Take advantage of natural moisture when possible.

Reporting — **Reporting Units** Shoulder Miles

Accomplishment shall be reported in Shoulder Miles.

Shoulder Miles is equal to shoulder length (mi) of accomplishment per side of road section. For example if shoulders are repaired on both sides of a one mile section of road, then two shoulder miles of work has been accomplished

Crew Size — **13 Workers**

	QTY
Widener Operator	1
Roller Operator	1
Truck Driver	6
Loader Operator	1
Power Broom Operator	1
Laborer	3

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

	QTY
Widener	1
Rubber Tired Roller	1
Dump Truck	6
Power Broom	1
Loader	1

*Traffic Control Equipment are NOT shown here

P.P.E.

1) Base PPE

2) Respiratory Protection (1 strap dust mask - broom sweepers)

Materials

Course Aggregate # 73- STN-(Short Ton) INDOT Spec Section 904

Other References

Sub Activities

Average Daily Production	13 Shoulder Miles	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Recondition Shoulders	CODE	2130

Work Method

1. Place signs and safety devices
2. Spread material with widener giving a ½" to 1" per foot slope in first pass
3. Shape and smooth mateial to original configuration
4. Roll as required for proper compaction
5. Clean work area with power broom
6. Remove signs and other safety devices

Special Considerations

Use this activity for areas larger than one mile that require aggregate usage to fill in drop offs.

Use Activity 2100 Blading Shoulders for areas less than one mile.

# of haul trucks needed:

Distance from stockpile to jobsite (mi)	# Trucks
5	3
10	4
15	5
20	5
25	6
30	7

APPROVED BY

Director, Highway Maintenance

Average Daily Production	13 Shoulder Miles	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Joint and Bump Repair	CODE	2140

Purpose

Report grinding of bituminous surfaces to remove bumps, ripples, and heaved joints. This activity also includes sealing over ground areas.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule removal of bumps > 1 in. or heaved joints on surfaces when normal traffic flow is interrupted.

This activity is typically completed in the spring and fall when the bumps are at their midpoint.

Sealing shall be completed within three days after grinding.

Reporting

Reporting Units Bumps

Accomplishment shall be reported in number of bumps removed.

Rental equipment and operators must be reported to the cost day cards for this activity

Sealing of the ground areas during the job or at a later date should be reported to this activity. Sealing at a later date is zero accomplishment and shall be included on same work order as grinding.

Crew Size — 5 Workers

	QTY
Truck Driver	2
Laborer	2
Skid Loader Operator	1

*Traffic Control Personnel are NOT shown here

P.P.E.

Base PPE

Materials

Liquid Bituminous (AE-90S) (Gal-Gallons) INDOT Spec Section 902.01(b)

Bituminous Mix (STN-Short Ton) INDOT Spec Section 902.01

Sand (STN-Short Ton) INDOT Spec Section 904

Job Specific Equipment

	QTY
Grinder/Skidsteer Loader	1
Tar Kettle	1
Grader (as required)	1
Dump Truck	1
Water Truck	1
Power Sweeper	1

*Traffic Control Equipment are NOT shown here

Other References

Sub Activities

Average Daily Production	23 Bumps Removed	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Joint and Bump Repair	CODE	2140

Work Method

1. Place signs and safety devices
2. Mark limits of area for grinding
3. Grind bumps to be repaired

   Where material is excessively deep, use multiple passes

   Use hand brooms or power sweeper to collect or remove all material
4. Haul material to storage or use on site to reshape on to shoulder
4. Patch area as required
5. Seal area with liquid bituminous AE-90S and sand (during job or no later than 3 days following)
6. Clean work site
7. Remove signs and safety devices

Special Considerations

Keep dust to a minimum by watering.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	23 Bumps Removed	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Other Roadway & Shoulder Maintenance	CODE	2190

Purpose

Perform other work activities on the roadway and shoulder that are not specifically identified as separate work activities. This activity does not include preparation and clean-up work directly related to another activity.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule throughout the year as required observing temperature and weather limitations for individual activities. If excavation equipment is needed, then a locate is needed with Indiana811.

Reporting | **Reporting Units** Person Hours

Accomplishment is reported in person hours.

Crew Size | **Workers**

Determined by the specific work activity to be performed	QTY

Job Specific Equipment

Determined by the specific work activity to be performed	QTY

P.P.E.

1) Base P.P.E.

Materials

Determined by the specific work activity to be performed

Other References

Sub Activities

2105 – Repair of crossovers
2110 – Repair of bleeding pavement
2115 – Spot sealing
2120 – Surface milling
2125 – Installation or repair of concrete curb ramps
2130 – Repair of concrete curbs
2135 – Repair of concrete sidewalks
2140 – Removal of sod by hand

Average Daily Production	Person Hours	EFFECTIVE DATE	July 1, 2016

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Other Roadway & Shoulder Maintenance	CODE	2190

Work Method

This activity is only to be used for work that is not specifically covered by another activity. Examples include:

- Repair of paved and unpaved crossovers
- Repair of a bleeding pavement surface with aggregate
- Spot sealing of the pavement not related to bump grinding; If spot sealing is related to bump grinding, it should be reported to Activity 2140 – Joint and Bump Repair
- Surface milling of the pavement; If surface milling is related to spot paving or bump grinding, it should be reported to Activity 2030 – Spot Paving or Activity 2140 – Joint and Bump Repair, whichever is appropriate
- Installation or repair of curb ramps
- Repair of concrete curbs
- Repair of concrete sidewalks
- Minor removal of sod at the edge of pavement by hand; If removal of the sod requires heavy equipment, it should be reported to Activity 2120 – Clipping Shoulders
- Removal of sod from under guardrail

All repairs of paved pavement, including potholes, washouts, mailbox approaches and public road approaches, should be reported to Activity 2010 – Permanent Shallow Patching, Activity 2011 – Temporary Shallow Patching or Activity 2020 – Deep Patching, whichever is appropriate.

All repairs of unpaved shoulders, including potholes, washouts, drop-offs, mailbox approaches and public road approaches, should be reported to Activity 2100 – Spot Repair of Unpaved Shoulders.

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	July 1, 2016

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Mowing	CODE	2210

Purpose

Mowing roadsides maintains safe sight distance, also temporary controls woody vegetation, invasive/noxious plants. For the maintenance of native planting either wildflowers or warm-season grasses.

Category Right-of-Way

- ☒ **PM**
- ☒ **QA**
- ☒ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

This activity to be cost efficient must be scheduled after seed heads have started to bolt on cool-season grasses.

This happens in Southern Indiana in mid May and Northern Indiana in late May to early June. Spot Mowing (Activity 2270) may be needed to keep line of sight clear at interchanges & median crossovers.

Mowing needs to be coordinated with herbicide treatments both contracted and in-house (Activity 2230).

All mowing must be performed in accordance with the current Mowing Policy.

Coordination of mowing needs to be made with Construction in advance of contracts that would need to have area mowed prior to beginning, i.e. resurfacing, herbicide contracts.

Mowing of native/wildflower shall be done prior to greenup in the spring or after plants goes dormant in the fall.

Reporting

Reporting Units Swath Miles

Accomplishment is total swath miles mowed. A swath mile is 4 feet X 1 mile (5280 ft.) = 1 swath mile, 1 acre = 2 Swath Miles

All sign and guardrail trimming will be recorded on this activity.

Additional special spot mowing efforts to control Noxious/Invasive Plants or sight distance corrections should be reported to Activity 2270 – Spot Mowing and Hand Trimming.

Crew Size — 2-5 Workers

	QTY
Tractor/Mower Operators	1-4
Truck Driver/Laborer/Trimmer	1

*Traffic Control Personnel are NOT shown here

P.P.E.

1) Base PPE

2) Face Protection recommended when using Trimmer(Weed Eater) or Edging Equipment.

NOTE: When hand-mowing Wild Parsnip, Poison Hemlock, Poison Ivy, or Giant Hogweed, long sleeved-shirt & soap /water are additional recommended.

Materials

None

Job Specific Equipment

50 to 100 horsepower tractor	1-4
5 to 15 foot rotary mower	1-4
Crew Cab with portable fuel tank	1
Weed Eater	1-2
Hand Broom	1-2

*Traffic Control Equipment is NOT shown here

Other References

RSP 623-M-025

Sub Activities

2205 - Maintenance mowing of native/wildflower planting

Average Daily Production	40- 55 Swath Miles	EFFECTIVE DATE	4/1/2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Mowing	CODE	2210

Work Method

1. Place safety devices.
2. Check safety equipment on tractor, fill equipment with fuel while engine is cool and not running.
3. Check safety equipment mower, all guards in place and working properly.
4. Check and adjust mower height to the correct mowing height to between 6 to 8 inches. This is the most important work method the operator has control over, if mowed less than 6 inches the grass root system is damaged allowing weeds to fill in areas covered by grass. When mower scalps or digs into ground the area is prone to invasive species to fill in the area. Proper mowing height will also extend the life of all equipment used to mow and cost to maintain.
5. Lubricate all grease zerk fittings daily or as recommended by manufacturer.
6. Start all mowing next to the shoulder and work your way out to the designated mowing limit. To be most efficient match the mower width to the area to be mowed, if mowing limited width on a wide R/W, one Batwing Mower should be used. On roads with narrow R/W's that only requires one pass, use a five or six foot mower to complete the limited width. Mower may mow either with or against traffic or any combination. When mowing with tractors on both sides of the road mowers must be separate by a minimum 500 feet. Tractors must not have any part of mowing equipment on the travel portion of the roadway.
7. Overlap each pass by 10% -15% to pick up any vegetation missed on first pass.
8. Stop tractor/mower and remove any debris/trash that may be thrown from mower, damage equipment or look unsightly after being cut.
9. Care should always be taken when mowing close to fixed object(signs, guardrail and other safety devises) not to damage or hit them.
10. Trimmers should cut broadleaf plants and the seed heads off of grass species around signs and guardrail. Trimmer will also need to load debris/trash that mowers moved to side in trim vehicle for disposal.
11. Clean equipment by sweeping with kitchen broom within the mowed area immediately after cutting any invasive or noxious plants. This will reduce the spread and cost to control these species.
12. Park equipment in a secure location that is out of the clear zone and that will discourage vandalism. Always get permission to park on private property and never re-fuel equipment on private property.
13. Remove safety devices

Special Considerations

Mowing less than six inches will reduce the overall score of Machine Mowing Quality Assurance Evaluation by 30 points.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	40- 55 Swath Miles	EFFECTIVE DATE	4/1/2015

INDIANA DEPARTMENT OF TRANSPORTATION (INDOT)

Activity 2210 - Machine Mow Quality Assurance Evaluation

District/ Sub district: _____ **Evaluation Date:** _____

Location Code: _____ **Route:** _____ **RP Start:** _____ **End:** _____

Date Project completed: _____ **Evaluated by:** _____

QA Type:0 to 7 days (initial) None (follow-up) **Final Score:** 0

OBSERVATIONS: **(2,600 ft. each section)**

1 Litter removed prior to mowing

			S1	S2	Avg
0	No				
5	Yes	**Points:**	**0.00**	**0.00**	**0**

2 Erosion @ signs or guardrail

			S1	S2	Avg
0	erosion				
5	No erosion bare ground				
20	No erosion with grass cover	**Points:**	**0.00**	**0.00**	**0**

3 Mowed to correct height _____

			S1	S2	Avg
0	Cut at< 6 inch height				
30	Cut > 6 inches & < 11 inches				
		Points:	**0.00**	**0.00**	**0**

4 Mowed uniformly

			S1	S2	Avg
5	Spot missed and large number of "rooster tails"				
8	Only occasional "rooster tail"				
10	R/W mowed neatly and cleanly	**Points:**	**0.00**	**0.00**	**0**

5 Damaged structures by mowing

			S1	S2	Avg
0	Major recent evidence of sign posts, drainage pipes, or headwalls damaged by mowers				
5	Minor evidence of sign post, drainage pipes, or headwalls damaged				
10	No damage	**Points:**	**0.00**	**0.00**	**0**

6 Trimming performed

			S1	S2	Avg
0	Posts and guardrail has not been trimmed with broadleaf weeds				
5	Posts and guardrail has not been trimmed but only grass at site				
10	All posts and guardrail neatly trimmed	**Points:**	**0.00**	**0.00**	**0**

7 Backside of guardrail

			S1	S2	Avg
0	Bareground >3 feet behind rail	**Points:**	**0.00**	**0.00**	**0**
10	Bareground <2 feet behind rail				
15	No bareground				

cont.2

Activity 2210 - Machine Mow Quality Assurance Evaluation

Page 2

Judgment of Evaluator (Evaluator's Comments Required) **continue**

TOTAL POINTS:

Observation #		1	2	3	4	5	6	7
Points	100	5	20	30	10	10	10	15

Rev 13-Jun

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

CHAINSAW SAFETY INSTRUCTIONS

ACTIVITIES 2220, 2221, 2250, 2251, 2260, 2280

This is the general instructions for the use of a chainsaw for all activities. Each activity is required to use a chainsaw and work methods vary only slightly but all can be dangerous if precautions are not followed.

GENERAL:

Only personnel trained in Basic Chain Saw Safety shall operate a chain saw and only qualified personnel qualified personnel shall perform brush cutting, tree trimming and tree removal operations.

There are many hazards associated with operating a chain saw and the types of injuries that could occur require that it never be a one person operation.

1. Personal Protective Equipment

   An OSHA approved Logger First Aid Kit shall be present and available at all times.

   Following Personal Protection Equipment shall be worn by the Chain Saw Operator

   - Hardhat
   - Chain Saw Chaps
   - Eye Protection
   - Face Protection
   - Hearing Protection
   - Protective Foot Wear
   - Hand Protection - Should have slip resistant palm
   - Assistant (Safety Observer)
   - Hardhat
   - Eye Protection
   - Hearing Protection
   - Protective Foot Wear
   - Hand Protection - Should have slip resistant palm

   In addition to above PPE, the Assistant (Safety Observer) shall have a whistle for warning others. If worn around neck, it must be tucked inside clothing to prevent becoming a hazard.Whistle shall be readily accessible but shall not be worn in a manner to become a personal safety hazard. Do not allow whistle to hang freely and become a “snag” hazard.

2. Communications:

   Crew shall have properly operating employer provided communication equipment capable of maintaining continuous communications with the local Sub District Office and develop backup procedures in the event of loss of communications.

3. Emergency Plan:

   Sub District:

   - Shall know the location of the work site
   - Provide routing directions to local emergency authorities.
   - Notify crew of all Weather Warnings for their area

   Work Crew:

   - Provide local Sub District with current work site location or relocation.
   - Provide the Sub District with emergency routing directions. (Example: For a work site that is located in a remote location off the roadway.)
   - If needed, when working off the roadway, identify emergency route by marking with cones, flags or other identifiable means.

- Be alert of changing weather conditions and request updates from the sub district as necessary. (All work shall cease and employees shall move to a safe place during electrical storms, periods of high winds or other weather conditions that may be dangerous to personnel.)

4. Work Site Hazards

There are many hazards associated with operating a chain saw and the types of injuries that could occur require that it never be a one person operation. All Chain Saw Operations, at a minimal, shall consist of a Chain Saw Operator and an Assistant (Safety Observer)

A work site hazard assessment shall be conducted prior to all operations and hazards identified.

A. Hazard Identification:

All hazards and obstruction shall be identified and addressed prior to commencement of work.

Areas that may be of concern but not limited to are:

- Fences – to include Property Lines
- All utilities – such as pipe line markers, valve stations, overhead lines, etc.
- All buildings and structures
- Side walks, Bike Paths, Roadways. Etc.
- Vehicles
- Pedestrian traffic
- Other trees or brush

5. Tree Felling

Proper tree felling procedures shall be developed and only personnel trained and qualified in tree felling shall perform this type of operation.

Types of Hazards:

Every tree is unique and must be approached with extreme caution. Trees shall be identified and a hazard assessment shall be conducted prior to all cutting operations.

Some of these hazards are:

- Dead Limbs and tops
- Excessive lean
- Fungus
- Rot and cavities
- Loose bark (could indicate hidden tree rot)
- Conks (signs of physical distress)

A. Planning and Assessment:
- Determine the lean of the tree
- Direction for the fall of tree.
- Clear an area around the tree before starting to cut.
- Fell with lean of tree whenever possible

B. Preparation:

Always ensure a “clear area” is established prior to cutting operations.

- Cut/remove all dead snags or stubs first,
- Prepare two escape routes 45-degrees away from the direction of fall.
- Be sure your escape routes are not obstructed with underbrush or objects.

- Before starting to cut, make sure no one is closer than two tree lengths away from felling operations.

C. Cutting:
- Make a notch on all trees no matter how small the diameter.
- Prevent “kick back” by leaving sufficient wood between the notch and the “back cut” to allow a hinge. (Never cut a standing tree completely through)
- Give a timely yell understood by all employees, just before the “back cut”.
- Retreat by using “escape routes” to a safe distance of at least 20 feet from tree. If possible, stand behind another tree at the end of your retreat path.

6. Chain Saw Operations Using A Bucket Truck (Aerial Lift Equipment)

All Bucket Truck operations shall be conducted by a qualified operator and shall follow all safety rules associated with chain saw and aerial lift equipment. Operations in or alongside roadways shall adhere to the Work Zone Safety Manual. All personnel associated with this type of operation shall wear Hard Hats at all times when outside of a vehicle.

A. Danger Zone:

- That area around the Bucket Truck and the cutting zone where there is operating equipment and or falling limbs or other debris.
- Danger Area: The supervisor shall evaluate the area around the cutting zone and equipment and establish a Danger Zone. No one shall be allowed in this area without the Safety Observers permission.

B. Safety Observer:
- A person designated by the supervisor to observe all ground activity and coordinate with the Bucket Operator entry of workers into the Danger Zone. At no time will personnel be allowed in the Danger Zone with out the permission of the Safety Observer. The Safety Observer shall have permission from the Bucket Operator before allowing personnel entry to the Danger Zone. No one is allowed inside the Danger Zone while equipment or chain saw is in operation.

C. Bucket Truck (Aerial Lift Equipment) Operator
- The operator shall be qualified to operator all associated equipment and shall maintain visual and or oral communications with the Safety Observer to ensure no unauthorized entries within the Danger Zone. No one is allowed inside the Danger Zone while equipment or chain saw is in operation.
- A two person operation where there is a chain saw operator and an aerial lift operator occupying the same platform, both persons must wear all PPE required for operating a chain saw.

D. Other Equipment
- All other vehicles, trailers, chippers, etc. shall not be parked inside the Danger Area.

7. Warning Signals & Briefings

A. Emergency or Danger Warning Signal:
- The Assistant (Safety Observer) shall use a whistle to sound a warning and all work shall cease immediately and an assessment shall be performed before work recommences. Whistle shall be readily accessible but shall not be worn in a manner to become a personal safety hazard. Do not allow whistle to hang freely and become a “snag” hazard.

B. Emergency or Danger Warning Signal:
- The Assistant (Safety Observer) shall use a whistle to sound a warning and all work shall cease immediately and an assessment shall be performed before work recommences.

C. Daily Safety Brief:
   - It is vital that a Daily Safety Brief is conducted and all parties understand their assigned jobs/duties, special warning signals and their emergency actions. The supervisor will ensure the Operator and Assistant (Safety Observer) have discussed and clearly understand all communication signals.

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Manual Brush Cutting	CODE	2220

Purpose

This activity is used where mechanical brush cutting is not feasible or assessable, examples are under & around bridges and communities that are sensitive to other methods of brush cutting.

The benefit of this activity are as follows:

- Allows access to the bridge inspection equipment and personnel.
- Save environmental mitigation when rehabilitation work is needed on bridges.
- Prevents damage to bridge structures from falling trees.
- Prevents customer complaints when near sensitive areas.
- Provides quick response to isolated complaints.

Category Right-of-Way

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Brush cutting should be scheduled anytime temperatures are below 60 degrees. Brush is defined to be any tree or shrub species less than 3 inches in diameter at a height of 4 ½ feet from the ground. This is called "Diameter at Breast Height (DBH). Any tree above the 3" at DBH must not be cut down between April 1st to October 1st , due to the federally protected Indiana Brown Bat However trimming of limbs of any size may occur at any time. If you see any bat in any tree stop all work and Central Office Environmental Office must be contacted.

Removal of downed limbs or other storm debris should be reported to Activity 2611, Storm Debris Removal.

Work needs to be coordinated with bridge deficiencies.

Reporting

Reporting Units Square Feet

Accomplishment is the number of square feet cleared.
When cutting brush at bridge locations, report to the bridge asset and not road section.
Measure the length times the width (in feet) to determine the area cleared for reporting purposes. Detail drawings below.

Crew Size **3 Workers**

	QTY
Laborer	3

*Traffic Control Personnel are NOT shown here

P.P.E.

1) Base PPE
2) Face Protection
3) Chainsaw Chaps.
4) OSHA Logger's First-Aid Kit

Additional PPE per Safety Data Sheet and Pesticide Label
No Loose Fitting Clothing or Jewelry

Materials

Herbicide

Basal Oil

Job Specific Equipment

Chipper
Chain Saw
Herbicide application equipment
Chainsaw tools
*Traffic Control Equipment is NOT shown here

Other References

Pesticide label

Sub Activities

Average Daily Production	10,000 - 15,000 Sq.Ft	EFFECTIVE DATE	July 1, 2016

ACTIVITY	Manual Brush Cutting	CODE	2220

Work Method

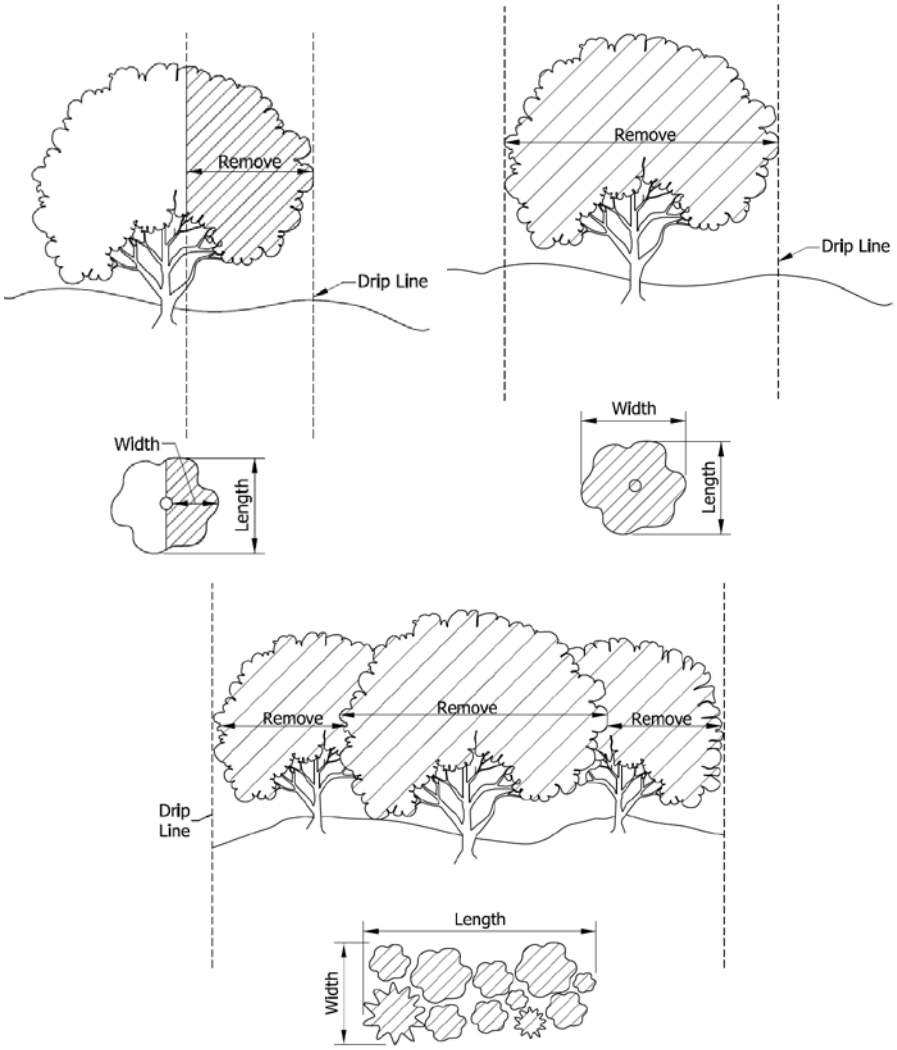
Manual cutting using chainsaw.

1. Place all Safety Devices
2. Put on all of your proper safety equipment, as injury and death may occur from chainsaw operation. Tie back long hair and remove any jewelry from your body.
3. Set the chainsaw on a flat area. Place your left hand on the front handle and your right foot inside the rear handle. Grab the starter rope with your right hand and start the chainsaw according to your model's starting instructions.
4. Walk up to the first bush to be cut. Depress the throttle completely and move the tip across the branches of the bush. Work from the top down and cut slowly to the desired depth.
5. Cut as much as possible with the tip and the underside of the bar, where most of the power comes from, giving it a cleaner cut. Move the tip slowly and always keep an eye on the tip. Keep all people at least 10 yards away at all times. All stumps shall be cut to a level not to extend over 2 inches from being flush to the ground.
6. Turn the chainsaw off if any pieces of the bush become trapped between the chain and the bar. Lock the safety brake when you're walking with the chainsaw. Keep both hands on the chainsaw at all times when it is running.
7. If under a bridge, debris should be stacked on the edge of R/W, never stack under bridge deck or where high water will carry downstream. If on roadside the debris should be processed through a brush chipper and disbursed on R/W or deposited in truck and dumped at an approved location.
8. Apply an approved Cut Stump Treatment to all stumps within 1 hour after cutting.
9. Remove all Safety Devices.

Average Daily Production	10,000 - 15,000 Sq. Ft	EFFECTIVE DATE	July 1, 2016

ACTIVITY	Manual Brush Cutting (Continued)	CODE	2220

Work Method Continued



Notes:

1. When drip line/limbs are touching, the area to be measured is from the outer limits of the end bushes.
2. When isolated brush is removed, instead of calculating the area as a circle, square the area off.
3. Square Footage = Length x Width
4. This activity is for brush cutting. Brush is woody vegetation that is 3 inches or less in diameter at breast height.
5. Woody vegetation that is over 3 inches diameter at breast height is considered a tree, and should be reported to Activity 2250 Tree Trimming or Activity 2251 Tree Removal.

Special Considerations

		APPROVED BY	
		Director, Highway Maintenance	
Average Daily Production	**10,000 - 15,000 Sq. Ft**	**EFFECTIVE DATE**	July 1, 2016

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Mechanical Brush Cutting	CODE	2221

Purpose

Remove any brush that is blocking the safe sight. The benefits of this activity are as follows;

- Reduces asphalt deterioration caused by trapped moisture
- Provides shoulder space for the motoring public in emergencies
- Reduces damages to vehicles from low hanging limbs
- Increases the distance a motorist can see vehicles, children and animals along the sides of the roadway
- Removes vegetation that may obstruct traffic signs
- Eliminates invasive woody species.

Category: Right-of-Way

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

This work will be scheduled in the fall and winter months after leaves have fallen to avoid disturbing tree nesting birds and the hazard of cutting into a hornets' nest. Brush is defined to be any tree or shrub species less than 3 inches in diameter at a height of 4 ½ feet from the ground. This is called "Diameter at Breast Height (DBH)". **Any tree above the 3" at DBH** will not be considered **"Brush Cutting".**

Special consideration should be given to the location of this type of clearing if in a sensitive area. If controlling an invasive species this would be a reason for this work to take place at a sensitive site. District personnel should coordinate with Public Information officers of their plans and reasoning.

If work is being performed to cut back native trees (side trim). The branches cut should be smaller than one (1) inch so not to harm the health of tree. Limbs/branches larger than one (1) inch should have a finish cut using a chainsaw to make a uniform flat cut at the growth ring of the tree after using other mechanical methods.

Reporting | **Reporting Units:** Square Feet

Accomplishment is the number of square feet cleared.

Measure the length times the width (in feet) to determine the area cleared for reporting purposes. See drawings below.

Crew Size: 2-4 Workers

	QTY
Laborer	1-3
Equipment Operator	1

Note: Traffic Control Personnel are NOT shown here

Job Specific Equipment

	QTY
Boom Mower/Brush Grinder	1
Chipper	1
Chain Saw	1
Herbicide application equipment	1
Chainsaw tools	1

Note: Traffic Control Equipment is NOT shown here

P.P.E.

1) Base P.P.E.
2) Face Protection
3) Chainsaw Chaps. 4) OSHA Logger's First-Aid Kit
Additional PPE per Safety Data Sheet and Pesticide Label

No Loose Fitting Clothing or Jewelry

Materials

Herbicide

Basal Oil

Other References

Pesticide label

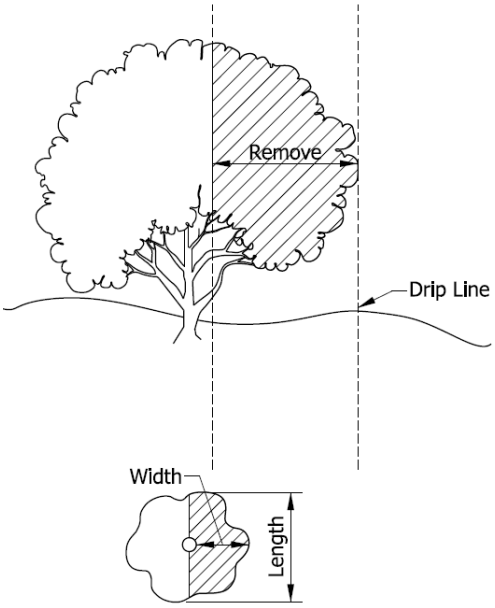
Sub Activities

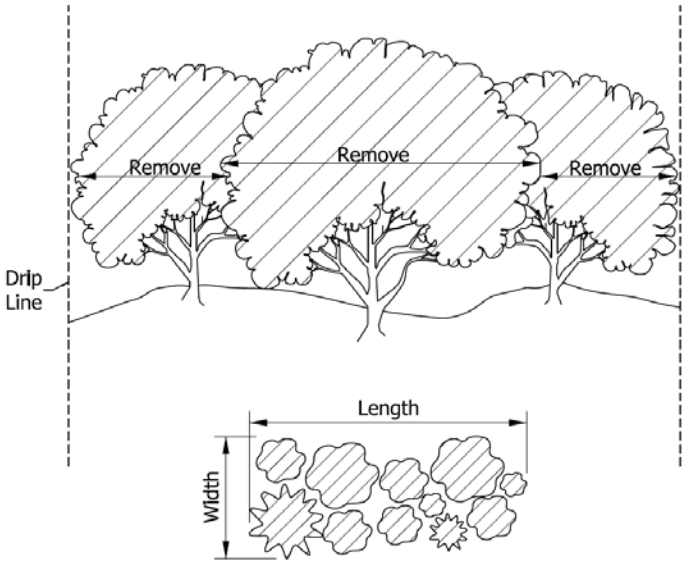
Average Daily Production	43,560 – 130,680 Sq. Ft	EFFECTIVE DATE	April 1, 2015

ACTIVITY	Mechanical Brush Cutting	CODE	2221

Work Method

1. Place Safety Devices
2. Begin on the outside of the brush being cut, making small swath no more than twelve (12) inches. This will help reduce the likelihood of throwing large debris outside work area.
3. After the first pass, make second pass to limb/debris on ground. This will make the debris smaller and eliminate the need to pick up.
4. Repeat step 2 and step 3. Continue to make swath on brush until goal is met or the limb/tree is too large for machine. The maximum diameter limb/log that can be cut with Boom mower is 3 inches. Inexperienced operators often try to cut heavier wood, damaging the mower.
5. If side trimming native tree, use chainsaw to make uniform flat cuts to affected limbs. When cutting invasive species, apply an approved herbicide to the cut to prevent the re-growth. No finish cuts should be made to invasive plants. This may only be completed while working machine if the cutting operation is a minimum of 500 feet from crew doing finish work.





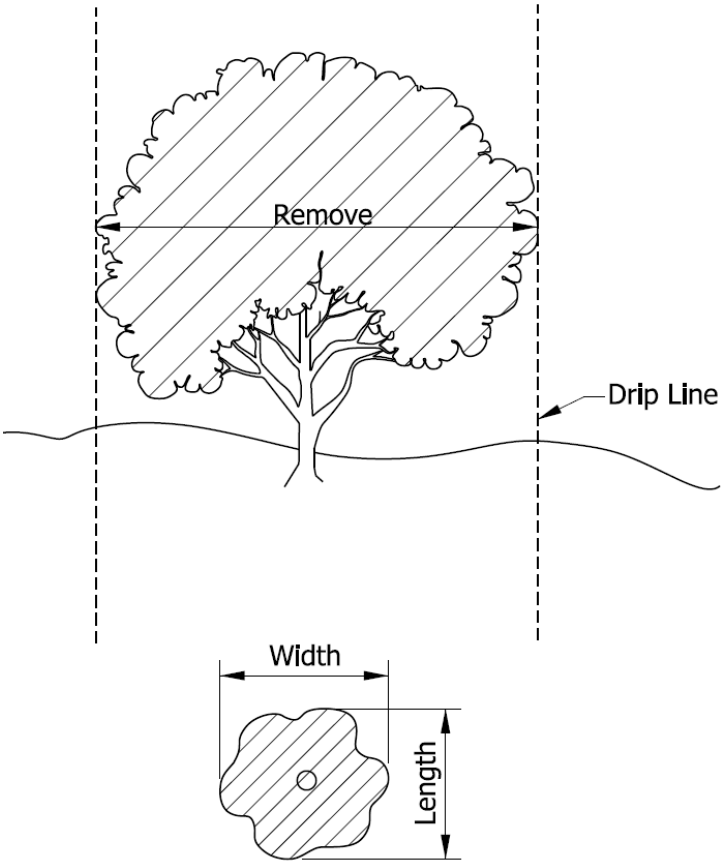
Notes:

1. When drip line/limbs are touching, the area to be measured is from the outer limits of the end bushes.
2. When isolated brush is removed, instead of calculating the area as a circle, square the area off.
3. Square Footage = Length x Width
4. This activity is for brush cutting. Brush is woody vegetation that is 3 inches or less in diameter at breast height.
5. Woody vegetation that is over 3 inches diameter at breast height is considered a tree, and should be reported to Activity 2250 Tree Trimming or Activity 2251 Tree Removal.

Average Daily Production	43,560 – 130,680 Sq. Ft	EFFECTIVE DATE	April 1, 2015

ACTIVITY	Mechanical Brush Cutting (Continued)	CODE	2221

Work Method Continued



Special Considerations

	APPROVED BY
	Director, Highway Maintenance

Average Daily Production	43,560 – 130,680 Sq. Ft	EFFECTIVE DATE	April 1, 2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Herbicide Spot Treatment	CODE	2230

Purpose

To control undesirable vegetation and noxious weeds, applying chemicals isolated locations along R/W's. The primary objectives for maintenance of Herbicide Spot Treatment is to comply with legal regulations for control of noxious weeds and protection of the environment.

Category Right-of-Way

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

This activity may be scheduled throughout the growing season depending on the species that is being treated. Always coordinate with mowing activities.

General guidelines are as follows;

Sub Activity 21(Bridge Cones) Late Summer till Frost

Sub Activity 22(Cut Stump) Fall, Winter, less than one (1) hour after cutting

Sub Activity 23(Guardrail & Signs), Spring, before weeds are 12 inches tall, summer after weeds have been cut.

Sub Activity 24(Johnson Grass), Summer, when plant is actively growing.

Sub Activity 26(Thistle), Throughout the growing season but prior to seed setting on biennial plants, fall gives better control of perennial plants

Sub Activity 27(Cattails) Summer prior to seed setting.

Sub Activity 32 (Crack Spraying) 30 days prior to sealing crew.

Sub Activity 34 (Rip Rap) Late summer to fall.

Sub Activity 35(Native Plant) Late fall to early Spring

Sub Activity 36 (Phragmites) August & September

Sub Activity 39(Wetland Maintenance) During times of low water levels

Sub Activity 97 (Basal Bark) Fall to Spring(before bud break)

Sub Activity 128 (Knapweed) Spring through Fall

Sub Activity 130 (Kudzu) From green up to Fall

Sub Activity 132 (Yard and Landscape) Spring or Fall

Sub Activity 133 (Barrier Wall) throughout growing season, prior to plants reaching ten (10) inches, for aesthetic reasons.

Sub Activity 137 (Purple Loosestrife) June & July, bud to flowering stages.

Sub Activity 190 (Woody Vegetation) Late spring to early winter, depending on application equipment and product used.

These general guidelines for spot treatments, if you have questions please contact the Roadside Coordinator at your District.

Reporting

Reporting Units Acres

Accomplishment is the total acres treated. Report work to the appropriate sub activity.

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Herbicide Spot Treatment	CODE	2230
Crew Size	2 Workers	P.P.E.	

	QTY
License Herbicide Applicator	1
Truck Driver	1

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Herbicide Spray unit

*Traffic Control Equipment is NOT shown here

P.P.E.

Base PPE

Additional PPE per Safety Data Sheet and Pesticide Label

Materials

Choose correct herbicide formulation for the plants to be controlled.

Other References

National Pollutant Discharge Elimunation System permit (NPDES)

Indiana Drift Watch

Labels & Msds

Sub Activities

See Scheduling & Coordination section.

Average Daily Production	2 - 10 Acres	EFFECTIVE DATE	7/1/2014

ACTIVITY	Herbicide Spot Treatment - Cont'd	CODE	2230

Work Method

1. Place signs and safety devices.
2. Read label of chemical. Handle, mix and apply only as label specifies for the intended use. If label is not specific about a certain area, contact the District management.
3. All herbicide must be applied by a licensed applicator.
4. Read and follow safety and legal requirements listed below.
5. Avoid mixing/loading on gravel driveways or other surfaces that allow spills to sink quickly through the soil. Install an anti-backflow device on the well or hydrants to prevent reverse flow of liquids into the water supply. Never put the hose in the sprayer tank. Provide an air gap of 6 inches between the hose and the top of the sprayer tank.
6. Mix chemical. Spray mixture must be mixed correctly and in the correct order
   - Water, fill the tank ¼ to ½ with carrier and begin agitation
   - Add water conditioners (for example, pH adjusters, ammonium sulphate)
   - Add granules / flowables / powders herbicides and mix well.
   - Add water soluble herbicides
   - Add stickers , spreaders , surfactants.
   - Add Drift retardant.
   - Water, fill the tank, continue agitation
7. Drift Control must be used at label rates for every tank.
8. Apply mix to designated areas using methods as instructed. If weather or wind changes and causes the potential for drift, then change locations or cease work and notify supervisor.
9. Remove signs and safety devices.
10. Clean and maintain clothing and protective equipment. DO NOT CARRY CHEMICALS HOME.
11. Know and follow spill containment procedures if a spill occurs.

Special Considerations

Document information necessary to comply with current pesticide laws(i.e. labels of all chemicals in tank + MSDS sheets). Place a complete description of the chemical and mixing instructions in truck cab.

A pesticide spill can happen to anyone—even to those individuals who exercise safety procedures to minimize the possibility. Your degree of emergency preparedness will have a direct impact on the severity of the situation if a spill occurs.

PLAN AHEAD...HAVE EQUIPMENT AVAILABLE FOR THE SPILL EMERGENCY

Be prepared. Missing, unavailable, and nonfunctional equipment is of no help in an emergency.

• Protective equipment for all products handled.

• Absorbent material to contain a spill (Granular absorbent, absorbent pads and boom, as appropriate).

• Tools for constructing temporary earthen dikes

APPROVED BY

Director, Highway Maintenance

Average Daily Production	2 - 10 Acres	EFFECTIVE DATE	7/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Herbicide Broadcast Treatment	CODE	2231

Purpose

To control undesirable vegetation and noxious weeds, applying chemicals continually to roadside vegetation and soil along shoulders maintained by State forces. The primary objectives for maintenance of roadside vegetation are to provide for safe highway operation and to comply with legal regulations for control of noxious weeds and protection of the environment.

Category Right-of-Way

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

There are two seasonal times that broadcast treatments should be scheduled. The first is in late summer/fall after crops have started to mature, this is indicated by the yellowing of leaves on both corn and soybeans. The second is in the spring before crops have been planted, scheduling during these two times will reduce your chances of crop damage. The fall is the best time to control perennial weeds and brush, this is the time of the year that these plants are storing energy for the winter. Large interstate R/W's may be scheduled throughout the growing season when doing the medians and areas next to the shoulders up to 20 feet. The same guidance as above will apply when treating within 10 feet from the interstate fence line.

Proper attention to the following three basic principles will improve the effectiveness of herbicides and decrease potential negative impacts to non-target species, the environment, and the applicator:

1.Choose the right herbicide for the job, plant identification is critical. If you do not know the plants to control, get assistance from District Roadside Coordinator.

2. Apply the herbicide at the right time, knowing life cycles of plants is beneficial in two ways. The life cycles will tell the manager when plants are more likely to be controlled. It can also tell the manager plants that will not be harmed at certain time in the cycle. Example are biennial plants. Bull thistle and Teasel has developed seed, treatment is a waste of resources.

3.Use the proper application technique, knowing equipment capability is needed to select method best suited for project. Examples for proper technique should consider, location of target plant, equipment needs and the knowledge/skill level of applicator. Additional site characteristics such as soil type, slope, and the existing vegetation — both target and non-target plants — should also be considered when selecting the herbicide and planning the application process.

Always read and follow the herbicide label directions.

Reporting

Reporting Units Acres

Accomplishment is the total acres treated. Records should be accurate and contain the following data:

1. Total area treated, in acres
2. Date and time of application.
3. Type of equipment used.
4. Herbicide(s) used.
5. Mixing information etc.
6. Rate of application.
7. Location (route number, mile post or distance from nearest intersection, distance treated).
8. Target vegetation.
9. Weather conditions at time of application (temperature, humidity, wind speed and wind direction).
10. Name of applicator and Pesticide Applicator License number.
11. Miscellaneous comments (including spray pressure, nozzle type, nozzle size, speed at which spraying and distance from spray nozzle to target).

Document information necessary to comply with current pesticide laws(i.e. labels of all chemicals in tank + MSDS sheets). Place a complete description of the chemical and mixing instructions in truck cab.

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Herbicide Broadcast Treatment	CODE	2231

Crew Size 2-4 Workers

	QTY
License Herbicide Applicator	1
Laborer	1-3

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Herbicide Spray unit	1

*Traffic Control Equipment is NOT shown here

P.P.E.

Base PPE

Additional PPE per Safety Data Sheet and Pesticide Label

Materials

Choose correct herbicide formulation for the plants that is being controlled.

Drift Control

Surfactant

Other References

National Pollutant Discharge Elimunation System permit (NPDES)

Indiana Drift Watch

Labels and Msds

Sub Activities

21 Bridge Cones	22 Cut Stumps	23 Guardrail & Sign
24 Johnson Grass	26 Thistle	27 Cattails
29 Other Invasive Species	32 Crack Spraying	34 Rip Rap
35 Native Plant	36 Phragmites	39 Wetland Maintenance
97 Basal Bark	128 Knapweed	130 Kudzu
133 Barrier Wall	137 Purple Loosestrife	190 Woody Vegetation

Average Daily Production	75- 100 Acres	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Herbicide Broadcast Treatment	CODE	2231

Work Method

1. Place signs and safety devices.
2. Read label of chemical. Handle, mix and apply only as label specifies for the intended use. If label is not specific about a certain area, contact the District management.
3. All herbicide application must be applied by a licensed applicator.
4. Read and follow safety and legal requirements listed below.
5. Avoid mixing/loading on gravel driveways or other surfaces that allow spills to sink quickly through the soil. Install an anti-backflow device on the well or hydrants to prevent reverse flow of liquids into the water supply. Never put the hose in the sprayer tank. Provide an air gap of 6 inches between the hose and the top of the sprayer tank.
6. Mix chemical. Spray Mixture must be mixed correctly and in the correct order
   - Water, Fill the tank ¼ to ½ with carrier and begin agitation
   - Add water conditioners for example, pH adjusters, ammonium sulphate.
   - Add granules / flowables / powders herbicides and mix well.
   - Add water soluble herbicides
   - Add stickers , spreaders , surfactants.
   - Add Drift retardant.
   - Water, fill the tank.
   - Continue agitation
7. Drift Control must be used at labels rates to every tank.
8. Apply mix to designated areas using methods as instructed. If weather or wind changes and causes the potential for drift, change locations or cease work and notify supervisor.
9. Remove signs and safety devices.
10. Clean and maintain clothing and protective equipment. DO NOT CARRY CHEMICALS HOME.
11. Know and follow spill containment procedures if a spill occurs.

Special Considerations

Document information necessary to comply with current pesticide laws(i.e. labels of all chemicals in tank + MSDS sheets). Place a complete description of the chemical and mixing instructions in truck cab.

A pesticide spill can happen to anyone—even to those individuals who exercise safety procedures to minimize the possibility. Your degree of emergency preparedness will have a direct impact on the severity of the situation if a spill occurs.

PLAN AHEAD...HAVE EQUIPMENT AVAILABLE FOR THE SPILL EMERGENCY

Be prepared. Missing, unavailable, and nonfunctional equipment is of no help in an emergency.

• Protective equipment for all products handled.

• Absorbent material to contain a spill (Granular absorbent, absorbent pads and boom, as appropriate).

• Tools for constructing temporary earthen dikes

APPROVED BY

Director, Highway Maintenance

Average Daily Production	75-100 Acres	EFFECTIVE DATE	4/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Seeding and Fertilizing	CODE	2240

Purpose

The purpose of this activity is to achieve successful soil stabilization and revegetation by providing simple, proven and cost-effective techniques, particularly along roadside ditches .

Vegetation is the most effective and efficient form of erosion control. When effectively established and maintained, vegetation can protect shoulders, ditches and slopes by preventing erosion and establishment of invasive/noxious weeds.

Category Right-of-Way

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Seeding should be scheduled any time adequate moisture is available and when soil temperatures are above 50 degrees . Seeding should be completed as soon as possible after any soil disturbance such as ditching and clipping unpaved shoulders.

Reporting — **Reporting Units** Acres

Accomplishment is the total acres seeded. This activity is used when seeding over ½ acre. (1 acre equals 43,560 ft.², 1/2 acre equals 21,780 ft.^{2}) If area is less the ½ acre use activity 2241 Spot Seeding & Fertilizing.

Crew Size 2 Workers

	QTY
Hydroseed/tractor operator	1
Truck driver	1

*Traffic Control Personnel are NOT shown here

P.P.E.

1) Base PPE
2) Eye wash Kit
3) Soap & Water for Washing

Materials

Grass seed/cool or warm season
Fertilizer
Hydro-mulch
Grass seed blanket

Job Specific Equipment

Hydroseeder	1
Tractor/no till drill	1
Tractor/fertilizer spreader	1
Tractor/tiller	1
Hand yard roller	

*Traffic Control Equipment is NOT shown here

Other References

327 A I C 15 - 5, Rule 5

Standard Specifications 621.03 thru 621.14,

Seed (914.04), Fertilizer(914.03),Mulch (914.05),Blanket (914.09)

Sub Activities

Average Daily Production	1 - 10 Acres	EFFECTIVE DATE	July 1, 2013

ACTIVITY	Seeding and Fertilizing	CODE	2240

Work Method

Work method is determined by the equipment used in the seeding process. If using hydro-seeder, fill tank to approximately 1/2 full or above the agitator inside tank.Next place water soluble fertilizer and any spreaders/stickers in with agitator activated. Continue filling with water and add grass seed and lastly hydro-mulch. Finish filling water tank and continue to agitate until ready to use.

Method 1. If using a hydro-seeder or seeding by hand there must always be seed to soil contact. There must be loose soil for roots to penetrate, if not seeds will germinate but will die shortly thereafter.

Grass stands can be improved using no-till methods to strengthen weak grass stands through the introduction of both legumes and/or grasses.

Site Preparation Steps for hydro seeding or broadcast seeding & matting.

1. Place signs and other safety devices.
2. Clear the site of all rocks , stones or other debris that is larger than 2-3 inches in diameter.
3. Initial tilling, to a depth of at least 2 inches, should be completed prior to adding any topsoil or soil amendments.
4. Apply "starter fertilizer" that is high in phosphate (P, or the middle number on a bag of fertilizer), at a rate recommended for the particular product.
5. Finish grade the entire site, maintaining the rough grading contours and slopes, with a tractor-mounted box blade on large areas or heavy-duty rake on smaller sites.
6. Apply grass seed at a rate of 170 lbs per acre or 6 pounds per 1000 sq. ft.
7. Roll the area with a lawn roller one third full of water to firm and settle the surface and reveal any low spots that should be filled to match the surrounding grade surface.
8. Cover with Matting, Laying and Stapling.
    - Start laying the matting/covering from the top of the channel and unroll down-grade.
    - Allow to lay loosely on soil –do not stretch.
    - Upslope ends of the matting should be buried in an anchor slot no less than 6-inches deep. Tamp earth firmly over material. Staple the matting at a minimum of every 12 inches across the top end.
    - Edges of matting shall be stapled every 3 feet. Where multiple widths are laid side by side, the adjacent edges shall be overlapped a minimum of 2 inches and stapled together.
    - Staples shall be placed down the center, staggered with the edges at 3 foot intervals.
9. Maintenance, all soil stabilization blankets and matting should be inspected periodically follow installation, particularly after rainstorms to check for dislocation or failure and should be repair immediately. Continue to monitor theses areas until they become permanently stabilized.
10. Remove signs and other safety devices

Method 2. No-till seeding, in no-tillage planting systems, a planting is made directly into an essentially unprepared seedbed.

In addition to reducing soil erosion, no-till seeding conserve moisture already present in the seedbed. Moisture conservation, along with a dramatic reduction in water run-off, improves the water supply for the new seedlings. No-till seeding methods also require less time and fuel than traditional methods because rocks remain below the soil surface.

ACTIVITY	Seeding and Fertilizing	CODE	2240

Special Considerations

There are several rules that must be followed for no-till seeding to be successful. The five most important are:

1. Proper Soil Testing is a Must - It is a waste of time and money to try to establish or improve stands when the soil fertility and/or pH are too low to support productive plants. Fertilize and lime according to soil test recommendations prior to seeding.
2. Seed on the Proper Date - Depending on the situation, no-till seeding can be successful in late winter, spring or late summer/early fall. It is extremely important to make plans and preparations well in advance so the seeding can be made on time.
3. Use High-Quality Seed – Do not use seed that has been in storage for over 6 months, each month seed is stored it loses 5-8 % germination.
4. Control Depth of Seeding - Seeds of most forage plants are small and cannot be counted upon to emerge from a seeding depth of greater than 1/2 inch. Adjust seeding equipment to place the seed at a shallow depth of 1/4 - 1/2 inch. Placing the seed too deep is the most common single reason for failure to get a stand. If you see a few seeds on the soil surface after seeding, then your seeding depth is about right.
5. Because seeder is primarily designed for field applications, a minimum of 4 passes should be made over the entire area. These passes should be at different angles.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	1 - 10 Acres	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Spot Seeding and/or Fertilizing	CODE	2241

Purpose

The purpose of this activity is to achieve successful soil stabilization and re-vegetation by providing simple, proven and cost-effective techniques in areas less the 1/2 acre(21,780 Sq Ft), particularly along roadside ditches and wheel ruts cause by accident on grass shoulders and medians.

Category Right-of-Way

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Seeding should be scheduled any time adequate moisture is available and when soil temperatures are above 50 degrees . Seeding should be completed as soon as possible after any soil disturbance such as ditching, pipe replacement, vehicle accidents or anywhere the sod has been managed.

Reporting

Reporting Units Square Feet

Accomplishment is the total square footage seeded. Report to this activity when seeding under 1/2 acre. 1/2 acre equals 21,780 ft.^{2} This would include laiding sod and repairing wheel ruts.

Report seeding of > 1/2 acre to Activity 2240.

Crew Size

2 Workers

	QTY
Hydroseed/tractor operator	1
Truck driver	1

*Traffic Control Personnel are NOT shown here

P.P.E.

1) Base PPE

2) Eye wash Kit

3) Soap & Water for Washing

Materials

Grass seed/cool or warm season
Fertilizer
Hydro-mulch
Grass seed blanket

Sod

Job Specific Equipment

Hydroseeder	1
Tractor/no till drill	1
Tractor/fertilizer spreader	1
Tractor/tiller	1
Hand yard roller	1
Sod Cutter	1

*Traffic Control Equipment is NOT shown here

Other References

(327 A I C 15 - 5, Rule 5

Standard Specifications 621.03 thru 621.14

Seed (914.04), Fertilizer(914.03),Mulch (914.05),Blanket (914.09)

Sub Activities

Average Daily Production	7,500 Square Feet	EFFECTIVE DATE	1/1/2015

ACTIVITY	Spot Seeding and fertilizing	CODE	2241

Work Method

Work method is determined by the equipment used in the seeding process. If using hydro-seeder, fill tank to approximately 1/2 full or above the agitator inside tank.Next place water soluble fertilizer and any spreaders/stickers in with agitator activated. Continue filling with water and add grass seed and lastly hydro-mulch. Finish filling water tank and continue to agitate until ready to use.

Method 1. If using a hydro-seeder or seeding by hand there must always be seed to soil contact. There must be loose soil for roots to penetrate, if not seeds will germinate but will die shortly thereafter.

Grass stands can be improved using no-till methods to strengthen weak grass stands through the introduction of both legumes and/or grasses.

Site Preparation Steps for hydro seeding or broadcast seeding & matting.

1. Place signs and other safety devices.
2. Clear the site of all rocks , stones or other debris that is larger than 2-3 inches in diameter.
3. Initial tilling, to a depth of at least 2 inches, should be completed prior to adding any topsoil or soil amendments.
4. Apply "starter fertilizer" that is high in phosphate (P, or the middle number on a bag of fertilizer), at a rate recommended for the particular product.
5. Finish grade the entire site, maintaining the rough grading contours and slopes, with a tractor-mounted box blade on large areas or heavy-duty rake on smaller sites.
6. Apply grass seed at a rate of 170 lbs per acre or 4 pounds per 1,000 sq. ft.
7. Roll the area with a lawn roller one third full of water to firm and settle the surface and reveal any low spots that should be filled to match the surrounding grade surface.
8. Cover with Matting, Laying and Stapling.
    - Start laying the matting/covering from the top of the channel and unroll down-grade.
    - Allow to lay loosely on soil –do not stretch.
    - Upslope ends of the matting should be buried in an anchor slot no less than 6-inches deep. Tamp earth firmly over material. Staple the matting at a minimum of every 12 inches across the top end.
    - Edges of matting shall be stapled every 3 feet. Where multiple widths are laid side by side, the adjacent edges shall be overlapped a minimum of 2 inches and stapled together.
    - Staples shall be placed down the center, staggered with the edges at 3 foot intervals.

***Maintenance, all soil stabilization blankets and matting should be inspected periodically follow installation, particularly after rainstorms to check for dislocation or failure and should be repair immediately. Continue to monitor theses areas until they become permanently stabilized.

9. Remove signs and other safety devices.

ACTIVITY	Spot Seeding and fertilizing	CODE	2241

Method 2. No-till seeding, in no-tillage planting systems, a planting is made directly into an essentially unprepared seedbed.

1. Place signs and other safety devices.

In addition to reducing soil erosion, no-till seeding conserve moisture already present in the seedbed. Moisture conservation, along with a dramatic reduction in water run-off, improves the water supply for the new seedlings. No-till seeding methods also require less time and fuel than traditional methods because rocks remain below the soil surface.

There are several rules that must be followed for no-till seeding to be successful. The five most important are:

2. Proper Soil Testing is a Must - It is a waste of time and money to try to establish or improve stands when the soil fertility and/or pH are too low to support productive plants. Fertilize and lime according to soil test recommendations prior to seeding (soil testing kits are available at most hardware stores).
3. Seed on the Proper Date - Depending on the situation, no-till seeding can be successful in late winter, spring or late summer/early fall. It is extremely important to make plans and preparations well in advance so the seeding can be made on time.
4. Use High-Quality Seed – Do not use seed that has been in storage for over 6 months, each month seed is stored it loses 5-8 % germination.
5. Control Depth of Seeding - Seeds of most plants are small and cannot be counted upon to emerge from a seeding depth of greater than 1/2 inch. Adjust seeding equipment to place the seed at a shallow depth of 1/4 - 1/2 inch. Placing the seed too deep is the most common single reason for failure to get a stand. If you see a few seeds on the soil surface after seeding, then your seeding depth is about right.
6. Because the seeder are primarily designed for field applications, a minimum of 4 passes should be made over the entire area. These passes should be at different angles to ensure better coverage.
7. Remove signs and other safety devices.

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	7,500 Square Feet	EFFECTIVE DATE	1/1/2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Tree Trimming	CODE	2250

Purpose

The primary purpose of trimming trees is to ensure they stay healthy and grow correctly. Vegetation management is critical to maintaining the reliability of Highway users. So trees are also trimmed for safety purposes—if the branches are in a precarious position endangering the lives of passersby or at risk of causing property damage. When trees are affected by disease or insects, trimming or pruning is often the only solution possible. If extreme weather conditions have caused damage to the tree, then trimming can help the wounds heal and close faster.

Category Right-of-Way

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Deciduous trees may be pruned in the dormant season once leaves have fallen in October or November, but

January to March is preferred. Trimming in the dormant season is preferred to lessen the stress to the tree. Finish pruning in the spring, before color is evident in swelling leaf and flower buds. However there are no rules for pruning/trimming of trees on the Right of Way, this activity can be done any month.

Reporting

Reporting Units Trees

Accomplishment is the number of trees trimmed .

Crew Size **5-7 Workers**

	QTY
Operator	1
Assistant/Safety Observer	1
Laborer	2-3

*Traffic Control Personnel are NOT shown here

P.P.E.

1) Base PPE 2) Face Protection 3) Chainsaw Chaps
4) Safety Harness/Fall Protection when using aerial lift
5) OSHA Logger's First-Aid Kit

NOTE: Poison Ivy, long sleeved-shirt & soap /water are additional recommendations

No Loose Fitting Clothing or Jewelry

Materials

None

Job Specific Equipment

Boom Truck or Loader	1
Bucket Truck	1
Chipper	1
Rope, 3/4 inch rope a minimum of 100 feet long	1
Chainsaws (w/lanyard),appropriate size for the job	2-4
Appropriate round file for the chain size	1-2
Flat file, steel file to file the rakers with a depth gauge	1
Extra bars and chains	1-2
Wedges and lineman's axe	2-4
Chainsaw wrench specific to your brand of chainsaw	2

*Traffic Control Equipment is NOT shown here

Other References

Sub Activities

Average Daily Production	14-23 Trees	EFFECTIVE DATE	July 1, 2013

WORK PERFORMANCE STANDARD

ACTIVITY	Tree Trimming	CODE	2250

Work Method

1. Place signs and other safety devices
2. Consider pruning a branch if it meets any of the following criteria -
   - dead, dying or severely diseased branches.
   - sprouts forming at the base of the trunk
   - branches growing toward or across the tree's center
   - crossed limbs that rub together or may rub in the, future
   - V-shaped crotches (when possible to prune)
   - multiple leaders (upright branches that compete, as secondary trunks or may develop into additional, trunks)
   - nuisance growth (interfering with power lines, sidewalks, buildings, traffic or traffic visibility, etc.)The cut is the key to good pruning. As a rule, always cut back to a branch, twig or bud that is pointed in the direction you want the tree to grow.
   - This method encourages controlled, healthy new growth. If you're unsure whether to remove a branch, don't cut. You can always cut it later, but you can never put it back.
   - At the position where each branch originates from the trunk is a "collar" between the branch and the trunk. This branch collar contains vascular tissues from both the branch and the trunk. If you cut into the trunk tissue, you will interfere with the tree's natural protective mechanisms, allowing the entry of disease and insect pests which damage the tree trunk. Make your pruning cut outside the collar on the branch side without leaving a stub.
3. Never Top a tree! Topped trees have shortened life spans, pose safety hazards to people and property plus require continuing intensive maintenance.
4. Always start trimming on lower limbs and work your way up. Never start a cut unless all personnel and bystanders are clear.
5. Use chipper to reduce volume of waste material.
6. Haul to disposal area, dispose of waste according to INDOT environmental policy or Indiana Code.
7. Clean work area, being sure to clear roadway of any debris.
8. Remove signs and other safety devices

Special Considerations

INDOT will not maintain trees where property owners retained timber rights. Where such trees are known to exist and where hazardous to persons using the highway, INDOT will advise the owner of their responsibility to remedy the situation. Where the owner fails to take action within a reasonable period of time, INDOT will remedy the situation in the least costly method available.

INDOT will not maintain, remove or trim trees inside incorporated municipalities which are located in grassy strips between the edge of pavement and sidewalk.

NOTE: Incorporated municipalities have the responsibility for maintenance of trees to the corporate boundaries even though there are no curbs or sidewalks.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	14-23 Trees	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Tree Removal	CODE	2251

Purpose

Trees should be removed for safety purposes, which present a hazard buildings and roads, including the clear zone.

Category Right-of-Way

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

All routine/ planned tree removal shall be scheduled between October 1st between March 30th. This is due to the federally endangered Indiana Brown Bat. However if an emergency danger tree is identified that proposes an immediate hazard, it may be removed if it is determined that there is no loose bark or nesting areas is on tree. If removal is started and any bat is sighted, all cutting must stop and INDOT's Environmental Section should be notified. All tree removal should be communicated/ coordinated with the adjacent property owner.

Reporting | **Reporting Units** Trees

Accomplishment is the number of trees removed. The definition of a tree, as laid out by the American Forests organization, requires that the plant have one, and no more than one, woody vertical stem, and that stem must be at least 3 inches in diameter at 4 feet in height. A tree also must be at least 13 feet tall and have an indisputably spreading crown. If the woody vegetation is less than 3 inches in diameter at a height of 4 feet and at least 13 feet tall, the work should be reported to Activity 2220 Brush Cutting.

Crew Size 5-8 Workers

	QTY
Bucket Truck Operator	1
Safety Observer	1
Truck Driver/ Laborer	3

*Traffic Control Personnel are NOT shown here

P.P.E.

1) Base PPE 2) Face Protection 3) Chainsaw Chaps
4) Safety Harness/Fall Protection when using aerial lift
5) OSHA Logger's First-Aid Kit

NOTE: Poison Ivy, long sleeved-shirt & soap /water are additional recommendations

No Loose Fitting Clothing or Jewelry

Materials

None

Job Specific Equipment

Boom Truck or Loader	1
Bucket Truck	1
Chipper	1
Rope, 3/4 inch rope a minimum of 100 feet long	1
Chainsaws (with lanyard) ,appropriate size for the job	2-4
Appropriate round file for the chain size	2
Flat file, steel file is for the rakers with a depth gauge	1
Extra bars and chains	1-2
Wedges and lineman's axe	2-4
Chainsaw wrench specific to your brand of chainsaw	2

*Traffic Control Equipment is NOT shown here

Other References

DNR Entomology Website:
http://www.in.gov/dnr/entomolo/

US Fish and Wildlife Indiana Bat Website:
http://www.fws.gov/midwest/endangered/mammals/inba/

Sub Activities

Average Daily Production	3 Trees	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Tree Removal	CODE	2251

Work Method

1. Place signs and other safety devices.
2. Perform a hazard assessment of the work area before starting work.
3. Outriggers (stabilizers) extended properly and positioned on a solid surface or on pads.
4. Cut away any potential hazards such as vines and rotten or broken limbs
5. Always start trimming on lower limbs and work your way up. Never start a cut unless all personnel and bystanders are clear.
6. Use chipper to reduce volume of waste material.
7. Haul to disposal area, dispose of waste according to INDOT environmental policy and Indiana Code.
8. Clean work area, being sure to clear roadway of any debris.
9. Remove signs and other safety devices

Special Considerations

INDOT will not maintain trees where property owners retained timber rights. Where such trees are known to exist and where hazardous to persons using the highway, INDOT will advise the owner of their responsibility to remedy the situation. Where the owner fails to take action within a reasonable period of time, INDOT will remedy the situation in the least costly method available.

INDOT will not maintain, remove or trim trees inside incorporated municipalities which are located in grassy strips between the edge of pavement and sidewalk.

NOTE: Incorporated municipalities have the responsibility for maintenance of trees to the corporate boundaries even though there are no curbs or sidewalks.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	3 Trees	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Stump Removal	CODE	2260

Purpose

Eliminate traffic hazards or improve efficiency of other maintenance activities, by removing stumps within the right-of-way.

Category Right-of-Way

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule removal of stumps that are a traffic hazard and after tree removal(Activity 2251). Because this process can cause the machine to disturb soil for 1-3 inches below ground, underground utilities shall be located before work is to begin.

Reporting

Reporting Units Stumps

Accomplishment is the number of stumps removed.

Crew Size **2-5 Workers**

	QTY
Equipment Operator	1
Truck Driver / Laborer	1-3

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Stumper Cutter	1

*Traffic Control Equipment is NOT shown here

P.P.E.

1) Base PPE 2) Face Protection 3) Chainsaw Chaps 4) OSHA Logger's First-Aid Kit

NOTE: Poison Ivy, long sleeved-shirt & soap /water are additional recommendations

No Loose Fitting Clothing or Jewelry

Materials

Grass Seed

Top Soil

Other References

Standard Specifications 621.03 thru 621.14 and 914.01

Sub Activities

Average Daily Production	1-4 Stumps Removed	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Stump Removal	CODE	2260

Work Method

1. Place signs and other safety devices
2. Observe all safety precautions, install safety shields and guards.
3. Start by using a shovel or garden mattock to remove any rocks from around the base of the stump. This is important because rocks can dull or damage the teeth on the cutting wheel.
4. Use a chain saw to carefully trim the stump close to the ground. You could skip this and start right in with the grinder, but this extra step speeds up the job.
5. Use the hydraulic lever to raise the grinder wheel a few inches above the stump. Drive the machine forward to position the wheel directly over the stump's front edge. Start the wheel spinning and slowly lower it about 3 in. into the stump. Use the hydraulic lever to slowly swing the wheel from side to side to clear out the wood. After you've dug down at least 4 in., raise the wheel, advance the machine a few inches, and repeat the process. While operating the machine, always stand at the control panel, which is located near the rear of the machine and well away from the cutting wheel.
6. Little by little, continue to grind your way through to the other side of the stump.
7. Load and haul chips to disposal area
8. Check to make sure that the freshly dug hole is at least 4 in. below the ground. Rake up all the wood chips and fill the crater with topsoil.
9. Tamp down and lightly rake the soil. Spread out an even layer of grass seed, and then rake the seeds into the soil. Water the area and cover the seeds.
10. Clean and smooth work area
11. Place grass seed on site
12. Remove signs and other safety devices

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	1-4 Stumps Removed	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Spot Mowing	CODE	2270

Purpose

Spot mowing is used to control noxious/invasive weeds, mowing of intersections to improve sight distances prior to a scheduled mowing (Activity 2210), mowing state owned properties outside of the normal R/W , slope mowing with special equipment or by hand. This activity does not include mowing or trimming at rest areas, roadside parks, (Activity 2720), signs, guardrail Activity 2210), Sub-district, Districts or Unit locations (Activity 2830).

Category Right-of-Way

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule spot and hand mowing to correct any sight distance hazards due to overgrown vegetation. Spot mowing may also be done to delay Johnson grass, Canada thistle or other invasive plants from producing seeds.

Reporting **Reporting Units** Square Feet

Accomplishment is the square feet mowed.

Measure the length and width of the area mowed in feet. Multiply these two numbers together to get the square feet.

Use Sub-Activity number for type of work being done. Report in notes exact location by reference marker or street address for each site. If mowing is due to customer complaint include report number or other information to link complaint to work performed or type of invasive vegetation being cut.

Mowing of rest parks is reported to Activity 2720. Mowing of unit, sub-district, or district yards is reported to Activity 2830.

Crew Size **2 Workers**

	QTY
Tractor Mower Operator	1
Truck Driver / Laborer	1

*Traffic Control Personnel are NOT shown here

P.P.E.

1) Base PPE

2) Face Protection recommended when using Trimmer(Weed Eater) or Edging Equipment.

NOTE: When hand-mowing Wild Parsnip, Poison Hemlock, Poison Ivy, or Giant Hogweed, long sleeved-shirt & soap /water are additional recommended.

Materials

Job Specific Equipment

Tractor/ Mower	1
Mower / Rider	1
Mower/ Push	1
Weed eater	1
Mower/ Slope	1

Match mowers to mowing requirements

*Traffic Control Equipment is NOT shown here

Other References

IC 15-16-8

Chapter 8. Destruction of Detrimental Plants

Sub Activities

134- Mowing for safety conditions(sight distance)

135- Mowing noxious or invasive species.

136- Mowing State owned lots outside the normal right of way.

Average Daily Production	21,780-43,560 Sq Ft	EFFECTIVE DATE	July 1, 2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Spot Mowing	CODE	2270

Work Method

1. Place signs and other safety devices
2. Observe all safety precautions when mowing around property off right of way, units and sub-district buildings check for hidden objects that may be thrown from mower.
3. Check safety equipment on tractor and mower, all guards in place and working properly.
4. Check and adjust mower height to the correct mowing height to between 3 to 8 inches. No less the 3 inches when mowing yards and 6 to 8 inches when mowing on Right of Way. This is the most important work method the operator has control over, if mowed less than 6 inches the grass root system is damaged allowing weeds to fill in areas covered by grass. When mower scalps or digs into ground the area is prone to invasive species to fill in the area. Proper mowing height will also extend the life of all equipment used to mow and cost to maintain.
5. Lubricate tractor and mower grease fittings daily.
6. Mow only those areas necessary to eliminate safety hazard or ensure that the noxious or invasive species will not flower or seed. When mowing sight distance areas mow with flow of traffic starting at road shoulder, intersections should be mowed to ensure safe sight distances when in a small vehicle, if in doubt mow extra to ensure safe sight line.
7. When mowing yards ensure grass is not discharged in the direction of sidewalks or parked cars. Do not mow where people are at risk of being hit by an object struck by mower.
8. Clean equipment by sweeping with broom within the mowed area after cutting any invasive or noxious plant. This will reduce the spread and cost to control these species
9. Remove all signs and other safety devices.

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	21,780-43,560 Sq Ft	EFFECTIVE DATE	July 1, 2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Right-Of-Way Fence	CODE	2280

Purpose

Repair damaged, state-owned right-of-way fencing to maintain delineation of the right-of-way. Includes rebuilding existing fence using materials in place and/or replacing short sections of damaged fencing with new materials.

Category Right-of-Way

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule this work when other road work is not possible if not a hazard. Damaged fencing which is hazardous to the traveling public should be scheduled for removal and repair as soon as possible.

Reporting | **Reporting Units** Linear Feet

Accomplishment is the total linear feet of fence repaired or replaced.

Repair work taking multiple days should be reported to a single work order.

Removal of fence only, with no installation, is reported as the total linear feet removed. Report removal only to Subactivity 01.

Crew Size 3-4 Workers

	QTY
Tractor Operator	1
Truck Driver / Laborer	2-3

*Traffic Control Personnel are NOT shown here

P.P.E.

1) Base PPE 2) Face Protection 3) Chainsaw Chaps. 4) OSHA Logger's First-Aid Kit

NOTE: Poison Ivy, long sleeved-shirt & soap /water are additional recommendations

No Loose Fitting Clothing or Jewelry

Job Specific Equipment

Tractor	1
Chainsaw	2
Fence Stretcher/Pulley	1
Post Driver	2
Log Chain	1
Fence Pliers	2
50 foot Tape Measure	1

*Traffic Control Equipment is NOT shown here

Materials

Fence (INDOT Spec 910.18)

Salvage Fence

Tee Fence Post, (INDOT Spec 910.18)

Fence Ties/Clips (INDOT Spec 910)

Fencing Nails (INDOT Spec 910)

Barbed Wire Fence (INDOT Spec 910)

Other References

Sub Activities

200 - Fence Removal Only (no new installation)

Average Daily Production	260 Linear Feet	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Right-Of-Way Fence	CODE	2280

Work Method

1. Place signs and other safety devices
2. Remove any damaged fence and posts, salvage material if possible in the fence .
3. Measure the width and length of the hole,
4. Replace any T-posts that were damaged, they should be every 10 feet. T-posts have “blades” on them that should be buried at least 2 feet for a 5 foot fence.
5. Unroll a new roll of woven wire and cut a piece that is a minimum 12 inches longer than the hole you are patching.
6. Attach the fence to one corner/anchor post(Anchor post should be every 50-75 feet) with U staples/nails, and then put a temporary post in the ground beyond the other end, which you will attach the pulley to in order to stretch the fence. (Tractor may be used as anchor to stretch fence)
7. The fence should be stretched until the little V shaped crimps in it become about 1/3 straighter.
8. Start at the end furthest away from stretcher and began attaching the clips to fence. 5 clips per post is recommended, make sure the top of the fence is over one of notches on the post.
9. When all fencing has been attached, remove stretcher, pick up tools.
10. Remove signs and other safety devices

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	260 Linear Feet	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Other Roadside Maintenance	CODE	2290

Purpose

Report other routine roadside maintenance activities that are not specifically identified as separate activities.

Note: Work performed in preparation of or as follow up to a specific activity is to be recorded to that activity.

Category Right-of-Way

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule throughout the year as required. Observe temperature and weather limitations for individual activities.

Reporting **Reporting Units** Person Hours

Accomplishment is the total person hours. Ensure specific work description is included in the comments.

Ensure specific materials and equipment used are reported.

Repair work at one location taking multiple days should be reported to a single work order.

Repair of slides or major washouts should be reported to Activity 2291.

Crew Size **Workers**

QTY

Determined by specific repair being performed.

P.P.E.

Base P.P.E.

Materials

Determined by specific repair being performed.

Typical materials may include:

- Aggregates (#2, #53, #73, riprap) - tons (INDOT Spec 904
- HMA Surface - tons (INDOT Spec 402)
- Filter Cloth - Square Feet (INDOT Spec 718)
- Grass seed - pounds (INDOT Spec 621)
- Guardrail components (INDOT Spec 601)

Job Specific Equipment

Determined by specific repair being performed.

Other References

Sub Activities

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Other Roadside Maintenance	CODE	2290

Work Method

Examples of work to perform under this activity:

+ Rock cut maintenance
+ Spot slope repairs
+ Removal of unauthorized or illegal signs from within the right-of-way

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Roadway Slide Maintenance	CODE	2291

Purpose

Repair of roadway due to slope failures, slides, and large washouts impacting the mainline roadway.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule throughout the year as required. Observe temperature and weather limitations for the specific work being performed.

Reporting

Reporting Units Person Hours

Report accomplishment in person hours. Ensure specific work description is included in the comments.

For small washout repair (typically less than 50 tons of material), report to Activity 2390.

Ensure specific materials and equipment used are reported.

Slide repair work taking multiple days should be reported to a single work order.

Crew Size

Workers

QTY

Determined by specific repair being performed.

Job Specific Equipment

Determined by specific repair being performed.

P.P.E.

Determined by specific repair being performed.

Materials

Determined by specific repair being performed.

Typical materials may include:

- Aggregates (#2, #53, #73, riprap) - tons (INDOT Spec 904
- HMA Surface - tons (INDOT Spec 402)
- Filter Cloth - Square Feet (INDOT Spec 718)
- Grass seed - pounds (INDOT Spec 621)
- Guardrail components (INDOT Spec 601)

Other References

Sub Activities

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Roadway Slide Maintenance	CODE	2291

Work Method

Work conducted under this activity may include, but is not limited to:

- Removal of dirt and debris from the roadway
- Placing fill in settled or washed out areas
- Clean and reshape ditch from slide movement
- Cut and remove trees from roadway due to slide movement
- Shoulder work to maintain adequate shoulder for the traveling public
- Roadway or shoulder paving due to slide movement
- Resetting guardrail due to slope settlement
- Reseeding graded/filled areas

Special Considerations

Slides should be reported and investigated by the Geotechnical Engineering Section. They can make recommendations on repair methods and techniques.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Major Cleaning & Reshaping Ditching	CODE	2310

Purpose

The primary purpose of this activity is for excavating large amounts of soil or digging long distances to restore drainage along the roadside. This activity may be used to reshape ditches so a vehicle leaving the roadway can cross over them without the vehicle overturning, being abruptly stopped or causing the driver to lose control.

Category Roadway/Drainage

- ☒ **PM**
- ☒ **QA**
- ☒ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

Schedule this work on ditches which have standing water, have obstructions. Emphasis should be on ditches with excessive silting and blocked drainage structures. This should be done during the growing season, when it's easiest to reestablish vegetation. For large areas this is from mid-August through October,(lowest amounts and less intense rainfall events). Dredging shall be conducted during low water periods and “in the dry.”

Ditching Excavation area that is needed to be removed should be marked prior to the date of actual work. The amount will be determine by fixed flow elevation points (i.e. culvert inlets/outlets, catch basin inlets, etc.).

Plan for installation of temporary erosion & sediment control measures. Coordinate with underground utilities

This activity should also plan where to dispose of excavated material that are close to the work area. First choice should be to used on R/W, where washout/ erosion are accruing or where poor soil conditions exist.

Reporting — **Reporting Units** Linear Feet

Accomplishment is the total linear feet of ditch dug.

Only report continuous ditching of greater than 200 feet to this activity. Areas reported to this activity that are greater than 500 linear feet of excavated material shall have a survey of drainage area to be cleaned by a qualified person. Survey will consist of both depth elevations and finished transverse slopes and erosion control plans. A copy of this survey must be attached to the work order.

If waste material will be disposed of on private property, ensure an "Excavation Material Disposal" form is completed. Attach a copy of this form to the work order.

Ditching that is less than 200 feet shall be reported to Spot Ditching (Activity 2311).
Cleaning paved side ditches is reported to Other Drainage Maintenance (Activity 2390, Sub-Activity 819)

Crew Size — **6-9 Workers**

	QTY
Operator	1-2
Laborer	2-3
Truck drivers	3-4

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Excavator or Grader	1
Surveyor's Equipment	1
Dump truck	3-4
Travel loader or Loader	0-1
Tractor/Tiller or Tractor /Seed drill	1

*Traffic Control Equipment is NOT shown here

P.P.E.

Base PPE

Materials

Erosion Control Items

Grass seed

Fertilizer

Other References

327 A I C 15 - 5, Rule 5

Standard Specifications 205.01 thru 205.06

Standard Specifications 621.03 thru 621.14

Seed (914.04), Fertilizer(914.03),Mulch (914.05),Blanket (914.09)

Sub Activities	None		
Average Daily Production	1,000-1,200 Linear Ft	EFFECTIVE DATE	1/1/2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Major Cleaning & Reshaping Ditching	CODE	2310

Work Method

1. Place signs and other safety devices
2. Install silt/sediment control devises where needed to keep all material on R/W.
3. Survey the ditch bottom and adjacent culverts to determine where sediment has accumulated. If this hasn't already been identified by survey.
4. Identify any underground utilities and hand dig areas to proper elevations, 24 inches on each side of painted marks. This should be done while excavator is working in areas with no utilities.
5. When excavating excess material from a ditch, return the ditch to the original design depth and location. Over-excavation and undercutting can result in slope failure, road failure, and ditch head cutting.
6. Remove material and debris from ditch with excavator to allow drainage and load in trucks. All efforts shall be made to retain existing vegetation, especially along the ditch slopes to maintain slope stability. Careful precaution shall be taken as not to disturb vegetated ditch areas not requiring dredging.
7. The side slopes of the ditch/channel should not exceed the angle of repose of the soil comprising the ditch line, and should generally be 3:1 or flatter. Re-establish uniform flow line, taking care to avoid low spots which will accumulate water.
8. Avoid creating a "V" or cup bottom ditch, V-shaped ditches concentrate flow, become incised, and erode sediment
9. Dispose of waste according to INDOT environmental policy, INDOT is responsible for the proper disposal of items taken from INDOT's right-of-way.
10. Dress and shape fore-slopes and back slopes. Avoid creating steep slopes whenever possible.
11. Prepare area to be treated, ditch side slopes shall be seeded and mulched as soon as possible.
12. Apply fertilizer, seed and mulch side slopes as appropriate to prevent subsequent erosion.
13. Ditch cleanings are not to be left on the roadway surfaces. Sweep dirt and debris remaining on the pavement at the completion of ditch cleaning operations.
14. Remove signs and other safety devices
15. Remove silt/sediment control devices after permanent vegetation cover as been established.

Special Considerations

When disposing of ditching material off of state property, utilize the "Excavation Material Disposal Site" form. Attach a copy of this form to the work order.

		APPROVED BY	
		Director, Highway Maintenance	
Average Daily Production	1,000-1,200 Linear Ft	EFFECTIVE DATE	1/1/2015

Indiana Department of Transportation
Highway Maintenance Division
Excavation Material Disposal Site

A. Site Information

1. Name of the Property Owner: _____
2. Address/location of the Site: _____
   _____
3. Material to be disposed of at the Site: _____ Amount: _____
4. Date(s) of disposal operations: _____ to _____
5. Intended material use: _____
6. Environmental Impacts:
   a. Will there be impacts to wetlands or waters of the US at the Site? ☐ Yes ☐ No
   b. Is the Site in a Floodway? ☐ Yes ☐ No
   c. Will more than one acre of land at the Site be disturbed by disposal activities? ☐ Yes ☐ No
7. Comments:
   _____
   _____
8. Site Drawing: (*In the space below, include a sketch of the proposed Site, including where material is being dumped and used, as well as the closest waterway, if it can be seen. i.e. 500 feet north of limestone branch,*)

B. Certification

The Property Owner hereby certifies that the proposed disposal site, as described above, is in accordance with all local, state, and federal laws and that the Property Owner will only perform those operations at the site that are permitted and the material will be used only as stated above.

Signature of Property Owner: _____ Date: _____

Signature of Unit Foreman: _____ Date: _____

Signature of Subdistrict Manger: _____ Date: _____

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Spot Ditching	CODE	2311

Purpose

The primary purpose of this activity is to reduce the amount of disturbances to roadside vegetation in ditches while improving the drainage of area.

By machine cleaning and reshaping of roadside ditches, with an excavator or similar equipment to maintain adequate drainage.

This practice will reduce the pollution caused by maintenance ditch cleaning. Minimize vegetation removal to limit sediment and polutant discharge from the work area by leaving undisturbed sections to act as sediment filters.

Category Roadway/Drainage

- ☒ **PM**
- ☒ **QA**
- ☒ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule this work throughout the year on ditches which are ponding water or have minor obstructions. Emphasis should be on ditches with excessive silting and blocked drainage structures. Excavation area that is needed to be removed should be marked prior to the date of actual work. The amount will be determined by fixed flow elevation points (i.e. culvert inlets/outlets, catch basin inlets, etc.).

Coordinate with underground utilities

Reporting | **Reporting Units** Locations

Accomplishment is reported in number of locations spot ditched.

Areas reported to this activity will be no greater than 200 continuous linear feet of excavated material in a single location. Ditching that is longer than 200 feet shall be reported to Major Cleaning and Reshaping Ditching (Activity 2310).

Record the total footage ditched by inventory asset in the accomplishment portion of the Work Order. Ensure that each specific location and quantity is described in the comments field.

If waste material will be disposed of on private property, ensure an "Excavation of Material Disposal" form is completed. Attach a copy of this form to the work order.

Cleaning paved side ditches is reported to Other Drainage Maintenance (Activity 2390, Sub-Activity 819)

Crew Size 5-7 Workers

	QTY
Operator	1-2
Laborer/Truck Driver	3-4
Crewleader/ Surveyor Operator	1

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Excavator or Grader	1
Surveyor's Equipment	1
Dump truck	2-3
Travel loader or Loader	0-1
Tractor/Tiller or Tractor /Seed drill	1

*Traffic Control Equipment is NOT shown here

P.P.E.

Base PPE

Materials

Erosion Control Items

Grass seed

Fertilizer

Other References

327 A I C 15 - 5, Rule 5

Standard Specifications 621.03 thru 621.14

Seed (914.04), Fertilizer(914.03),Mulch (914.05),Blanket (914.09)

Sub Activities	None		
Average Daily Production	2 - 4 Locations Ditched	EFFECTIVE DATE	1/1/2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Spot Ditching	CODE	2311

Work Method

1. Place signs and other safety devices
2. Survey the ditch bottom and adjacent culverts to determine where sediment has accumulated.
3. When excavating excess material from a ditch, return the ditch to the original design depth and location. Over-excavation and undercutting can result in slope failure, road failure, and ditch head cutting.
4. Remove as little material and debris from ditch with excavator to allow drainage and load in trucks. All efforts shall be made to retain existing vegetation, especially along the ditch slopes to maintain slope stability. Careful precaution shall be taken as not to disturb vegetated ditch areas not requiring dredging.
5. Dispose of waste according to INDOT environmental policy. INDOT is responsible for the proper disposal of items taken from INDOT's right-of-way.
6. The side slopes of the ditch/channel should not exceed the angle of repose of the soil comprising the ditch line, and should generally be 3:1 or flatter. Re-establish uniform flow line, taking care to avoid low spots which will accumulate water.
7. Avoid creating a "V" or cup bottom ditch. V-shaped ditches concentrate flow, become incised, and erode sediment.
8. Dress and shape fore-slopes and back slopes. Avoid creating steep slopes whenever possible.
9. Prepare area to be treated, ditch side slopes shall be seeded and mulched as soon as possible.
10. Apply fertilizer, seed and mulch side slopes as appropriate to prevent subsequent erosion.
11. Ditch cleanings are not to be left on the roadway surfaces. Sweep dirt and debris remaining on the pavement at the completion of ditch cleaning operations.
12. Remove signs and other safety devices

Special Considerations

When disposing of ditching material off of state property, utilize the "Excavation Material Disposal Site" form. Attach a copy of this form to the work order.

		APPROVED BY	
		Director, Highway Maintenance	
Average Daily Production	2 - 4 Locations Ditched	EFFECTIVE DATE	1/1/2015

Indiana Department of Transportation
Highway Maintenance Division
Excavation Material Disposal Site

A. Site Information

1. Name of the Property Owner: _____
2. Address/location of the Site: _____
   _____
3. Material to be disposed of at the Site: _____ Amount: _____
4. Date(s) of disposal operations: _____ to _____
5. Intended material use: _____
6. Environmental Impacts:
   a. Will there be impacts to wetlands or waters of the US at the Site? ☐ Yes ☐ No
   b. Is the Site in a Floodway? ☐ Yes ☐ No
   c. Will more than one acre of land at the Site be disturbed by disposal activities? ☐ Yes ☐ No
7. Comments:
   _____
   _____
8. Site Drawing: (*In the space below, include a sketch of the proposed Site, including where material is being dumped and used, as well as the closest waterway, if it can be seen. i.e. 500 feet north of limestone branch,*)

B. Certification

The Property Owner hereby certifies that the proposed disposal site, as described above, is in accordance with all local, state, and federal laws and that the Property Owner will only perform those operations at the site that are permitted and the material will be used only as stated above.

Signature of Property Owner: _____ Date: _____

Signature of Unit Foreman: _____ Date: _____

Signature of Subdistrict Manger: _____ Date: _____

INDIANA DEPARTMENT OF TRANSPORTATION

☐ **Activity 2310 - Major Clean/Reshape Ditch Quality Assurance Evaluation**

☐ **Activity 2311 - Spot Ditching Quality Assurance Evaluation**

District/Sub distric _____ **Evaluated by** _____

WO # _____ **Route** _____ **RP Start** _____ **RP End** _____

Date Project Completed _____ **Initial Date** _____ **Follow Up Date** _____

QA Timing: Initial = 1- 4 Months; Follow Up = 12 Months **Final Score** 0%

OBSERVATIONS **Follow-up Score** 0%

1 Is the ditch excavated to the properly established grade?

0 Poor drainage and not level with bottom of pipes and other drains. Standing water greater than 1 inch.

7 Some drainage, but occasional standing water less than 1 inch deep.

15 Ditch cut to proper grade with good drainage with all drainage structures open

Points ☐

Follow-up Points ☐

2 Is the ditching waste removed?

0 No

5 Yes

Points ☐

3 Is erosion present?

0 Erosion greater than $^1/_2$ inch in depth on any excavated area

10 Erosion less than $^1/_2$ inch in depth on excavated area

15 No erosion or silt present

Points ☐

Follow-up Points ☐

4 Vegetation Establishment

0 Less than 40% coverage with approved grass mixture

10 41% to 75% coverage with approved grass mixture

15 Over 75% coverage of approved grass mixture

Points ☐

Follow-up Points ☐

continued on page 2

Activity 2310/2311 - Clean and Reshape Ditches Quality Assurance Evaluation

Page 2

5 What is the ditch angle?

Is it achievable? ☐

0	Angle greater than 3:1
5	Angle less than 3:1

Points ☐

6 Where is the ditch located in respect the its surrounding?

0	Too close to the road when ROW is available
5	Ditch is cut in line with pipe structures but not straight
10	Ditch is cut in line with pipe structures and has proper location in relation to drainage structures

Points ☐

Judgment of Evaluator (Evaluator's Comments Required)

Work orders completed & selected for Q.A. in the winter months (November through February) will be evaluation in April.

Initial Score **TOTAL POINTS** ☐

Observation #		1	2	3	4	5	6
Possible Points	65	15	5	15	15	5	10
Actual Points	0	0	0	0	0	0	0

Follow-up Score

Observation #		1	3	4
Possible Points	30	15	15	15
Actual Points	0	0	0	0

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Small Culvert Inspection	CODE	2320

Purpose

In order to maintain, preserve and indentify needs conduct inspection of all small culverts including box culverts, pipe culverts, catch basins, and inlets that span less than 48 inches measured at the centerline of the roadway. Defects should be reported for future scheduling.

Category Roadway/Drainage

- ☒ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

- Each culvert shall be inspected a minimum of once every four (4) years. Work shall be scheduled anytime throughout the year when weather conditions are favorable.
- Coordinate with Activity 2331 & 2332 (Pipe Replacement) and Activity 2336 & 2337 (Pipe Lining).

Reporting | **Reporting Units** Structures

- Accomplishment is the total number of culverts inspected.
- Each culvert inspected shall be recorded in WMS 30 days from the actual date of inspection, by Structure Number, with a new inspection report for each inspection event.
- Report to the specific culvert assets.

Crew Size — **2** Workers

	QTY
Trained Culvert Inspector	1
Truck Driver/Laborer	1

*Traffic Control Personnel are NOT shown here

P.P.E.

Base PPE

Materials

n/a

Job Specific Equipment

1 - Shovel	1 - Mirror
1 - Spot Light	1 - Waders
1 - Tape Measure	1 - Hammer
	1 - Probing Rod

*Traffic Control Equipment is NOT shown here

Other References

Operating Procedure NO. 29 *(Inspect Small Culverts)*
Operations Memorandum 13-02 & 13-02F *(Procedure for Large and Small Culvert Inventories)*
Small Culvert Inspection Training

Sub Activities

Average Daily Production	20 Structures	EFFECTIVE DATE	7/1/2016

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Small Culvert Inspection	CODE	2320

Work Method

1. Setup safety devices
2. Observe appropriate safety precautions
3. Take WMS inventory information into the field for culverts to be inspected.
4. Use hand shovel to remove undesirable vegetation, obstructions and to repair minor eroded areas
5. Inspect structure elements for structural adequacy
6. Determine if bats or birds or evidence of either is present within the structure limits, note on inspection form.
7. Log inspection on inspection field form (2320-A). Measure and record any required repair work and recommendations
8. Verify inventory accuracy and record any inventory modifications (i.e. Replaced or New Structure, RP, Direction, Location, Type, Length, Size, etc.) on inventory field form (2320-F). The inventory field form is only required if there has been an inventory modification.
9. Notify supervisor immediately when urgent deficiencies are found
10. Remove safety devices
11. Field forms must be transposed into an Inspection or Inventory Form in WMS.
    a. Complete the electronic Inspection or Inventory Form in WMS within 30 days of field inspection.
    b. Turn in inspection or inventory forms to Subdistrict for data entry to WMS

Special Considerations

- Activity may be done year round; however the best time to conduct inspections is when vegetation is not growing.
- Inspections shall be conducted in advance of contract work so pipes can be replaced, relined, or scheduled for repair work. Coordinate with Activity 2331 & 2332 (Pipe Replacement) and Activity 2336 & 2337 (Pipe Lining).
- Inexperienced personnel shall be trained prior to inspecting structures.

		APPROVED BY	
		Director, Highway Maintenance	
Average Daily Production	20 Structures	EFFECTIVE DATE	7/1/2016

Used with Activity 2320

Small Culvert Inspection Field Form

Road: _____ **Inspector(s):** _____

Unit: _____ **Direction of Travel:** ◯ Both ◯ Inc (N/E) ◯ Dec (S/W)

Date: _____ **Work Order:** _____

General Notes

1. All mile marker references should be entered to the nearest thousandth (0.001) of a mile by DMI

Class Code Key

BC – Box Culvert	**MH** – Man Hole	**SD** – Slotted Drain
C – Concrete Pipe	**MP** – Metal Pipe	**ST** – Slab Top
CB – Catch Basin	**MPP** – Multi-Plate	**O** – Other
FT – Farm Tile	**PL** – Plastic Liner	**VC** – Vitrified Clay
I – Inlet	**PP** – Plastic Pipe	**W** – Weir

Side of Road Key

R – Right Side
L – Left Side
M – Median
H – Highway
C – County

Condition Key

9 – Excellent – Perfect condition recently installed or repaired
7 – Good – No repairs needed, list specific items to consider for next inspection
5 – Fair – Acceptable conditions, increase inspection frequency
3 – Poor- In danger of failing, needs repair
1 – Critical – Culvert is failing
0 – Unknown / Not Found

Bats Key

Y – Bats and/or guano present
E – Bats heard only
N – No evidence of bats

Birds Key

Y – Nests visible
N – Nests not visible

Pg._____ of _____

Inspection																
Culvert Name	**Route**	**Start / End MP (00.000)**	**Class Code**	**Side of Road**	**County**	**Embank**		**End Section**		**Flowline**		**Culvert Condition**	**Bats Y/E/N**	**Birds Y/N**	**Comments**	**Incomplete Inspection**
						IN	**OUT**	**IN**	**OUT**	**IN**	**OUT**					
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Work Order: _____

SUPPLEMENT FORM

Pg._____ of _____

Inspection																
Culvert Name	Route	Start / End MP (00.000)	Class Code	Side of Road	County	Embank		End Section		Flowline		Culvert Condition	Bats Y/E/N	Birds Y/N	Comments	Incomplete Inspection
						IN	OUT	IN	OUT	IN	OUT					☐
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Form 2320–A (Rev. 07-2016)

Used with Activity 2320

Small Culvert Inventory Field Form

Road: _____ **Inspector(s):** _____

Unit: _____ **Direction of Travel:** ◯ Both ◯ Inc (N/E) ◯ Dec (S/W)

Date: _____ **Work Order:** _____

General Notes

1. All mile marker references should be entered to the nearest thousandth (0.001) of a mile by DMI
2. Please make sure all coordinate data is collected using the WGS84 datum and in decimal degree format.

Class Code Key

BC – Box Culvert	**MH** – Man Hole	**SD** – Slotted Drain
C – Concrete Pipe	**MP** – Metal Pipe	**ST** – Slab Top
CB – Catch Basin	**MPP** – Multi-Plate	**O** – Other
FT – Farm Tile	**PL** – Plastic Liner	**VC** – Vitrified Clay
I – Inlet	**PP** – Plastic Pipe	**W** – Weir

Side of Road Key

R – Right Side
L – Left Side
M – Median
H – Highway
C – County

Pipe Shape Key

A – Arched Pipe	**E** – Elliptical
C – Circular Pipe	**CB/I** – Catch Basin/Inlet
R – Rectangular	

Estimated Cover

< 5’
5’ – 10’
> 10’

Pg._____ of _____

Inventory

Culvert Name	Route	Start / End MP (00.000)	Class Code	Side of Road	County	Y Coordinate (Latitude) (00.00000)	X Coordinate (Longitude) (00.00000)	Length (ft.)	Pipe Shape	Height (in)	Width (in)	Est Cover (ft)	Comments

Form 2320–F. (Rev. 07-2016)

Work Order:_____

SUPPLEMENTAL FORM

Pg._____ of _____

Inventory													
Culvert Name	**Route**	**Start / End MP (00.000)**	**Class Code**	**Side of Road**	**County**	**Y Coordinate (Latitude) (00.00000)**	**X Coordinate (Longitude) (00.00000)**	**Length (ft.)**	**Pipe Shape**	**Height (in)**	**Width (in)**	**Est Cover (ft)**	**Comments**

Form: 2320-F (Rev. 07-2016)

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Culvert Replacement - Small Pipe (≤36")	CODE	2331

Purpose

Excavation, removal, and installation of pipe less than or equal to 36” diameter or equivalent for arches. Deterioration, damage or hydraulic inadequacy results in a required pipe replacement to ensure adequate drainage and flow.

Category Roadway/Drainage

- ☒ **PM**
- ☐ **QA**
- ☒ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

- Activity should be evaluated based on the current condition of the pipe and any inspection findings (Activity 2320) or reported damages. This activity should be performed in advance of any surface treatments (i.e. Pavement overlay, chip-seal, etc.) including work done under contract.
- Ensure appropriate hydraulic and environmental approvals have been obtained prior to the activity field work.
- Report to the specific small culvert assets.
- Submit a request for locate services at least 2 days prior to any excavation.
  - o ***Indiana811****: (800) 382-5544, http://indiana811.org/*

Reporting

Reporting Units Linear Feet

Accomplishment is the linear feet of installed pipe. Report all work to one Work Order including sign/detour placement, sight preparation, material deliveries, saw cutting pavements, excavation, installation, backfill and surface overlay.

NOTE:

1) Pipe Lining shall NOT be reported to this activity. Pipe lining small culverts shall be reported to Activity 2336
2) This activity shall NOT include replacement of pipes greater than or equal to 36". Replacement of pipes greater than or equal to 36” shall be reported to Activity 2332.
3) Pipe extensions shall be reported to Activity 2390 (Other Drainage Maintenance)

Crew Size — **6** Workers

	QTY
Crew Leader	1
Excavator Operator	1
Truck Driver	2
Laborer	2

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Excavator/Backhoe	1
Dump Truck	2
Crew Cab	1
Compressor	1
Jack Hammer	1
Mechanical Compactor	1

*Traffic Control Equipment is NOT shown here

P.P.E.

Base PPE

Materials

Pipe *(Section 908.02)*
Structure Backfill *(Section 904.05)*
Bituminous Mix *(Section 902)*
Rip-Rap *(Section 904.04)*
Geotextiles *(Section 918.02)*

Other References

- OSHA Safety and Health Standards for the Construction Industry: Subpart B - Excavations
- **Indiana811**: (800) 382-5544, http://indiana811.org/
- INDOT Standard Specifications *(Section 715)*
- Operations Memorandum 11-06 *(Environmental & Hydraulic Requirements for In-House Pipe Work)*

Sub Activities

Average Daily Production	45 Linear Feet	EFFECTIVE DATE	7/1/2013

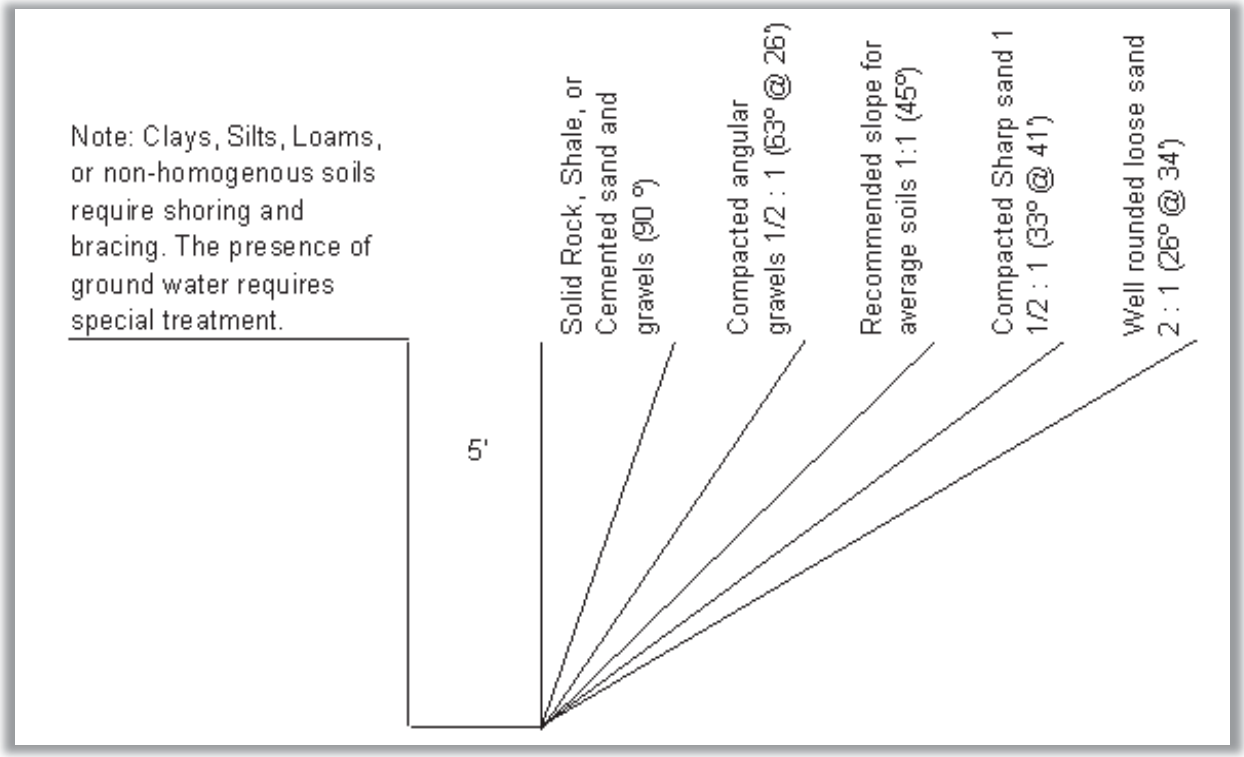
ACTIVITY	Culvert Replacement - Small Pipe (≤36")	CODE	2331

Work Method

1. Place signs and safety devices
2. Cut pavement over pipe to be replaced
3. Excavate and remove pipe
4. Clean out and replace pipe bed to original grade
5. Place culvert in trench beginning at downstream end
6. Back fill over culvert
   - ✓ Use suitable structure backfill *(INDOT Standard Specifications: Section 904.05 Structure Backfill)* material and compact in layers not exceeding 6"
7. Place bituminous patch over excavation and compact.
   - ✓ Utilize work method and details from Activity 2020 (Deep Patch), but report work to 2331.
8. Dress side slopes, inlets, outlets and ditches
9. Remove signs and safety devices

Special Considerations

When trenching five feet deep or more slope angles should be constructed for safe operations as shown in the diagram below.



APPROVED BY

Director, Highway Maintenance

Average Daily Production	45 Linear Feet	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Culvert Replacement - Large Pipe (>36")	CODE	2332

Purpose

Excavation, removal, and installation of pipe greater than to 36” diameter or equivalent for arches. Deterioration, damage or hydraulic inadequacy results in a required pipe replacement to ensure adequate drainage and flow.

Category Roadway/Drainage

- ☒ **PM**
- ☐ **QA**
- ☒ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

- Activity should be evaluated based on the current condition of the pipe and any inspection findings (Activity 2320) or reported damages. This activity should be performed in advance of any surface treatments (i.e. Pavement overlay, chip-seal, etc.) including work done under contract.
- Ensure appropriate hydraulic and environmental approvals have been obtained prior to the activity field work.
- Report to the specific small culvert or large culvert assets.
- Submit a request for locate services at least 2 days prior to any excavation.
  - o ***Indiana811****: (800) 382-5544, http://indiana811.org/*

Reporting

Reporting Units Linear Feet

Accomplishment is the linear feet of installed pipe. Report all work to one Work Order including sign/detour placement, sight preparation, material deliveries, saw cutting pavements, excavation, installation, backfill and surface overlay.

NOTE:

1) Pipe Lining shall NOT be reported to this activity. Pipe lining large culverts shall be reported to Activity 2337
2) This activity shall NOT include replacement of pipes less than 36". Replacement of pipes less than 36” shall be reported to Activity 2331.
3) Pipe extensions shall be reported to Activity 2390 (Other Drainage Maintenance)

Crew Size

6 Workers

	QTY
Crew Leader	1
Excavator Operator	1
Truck Driver	2
Laborer	2

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Excavator/Backhoe	1
Dump Truck	2
Crew Cab	1
Compressor	1
Jack Hammer	1
Mechanical Compactor	1

*Traffic Control Equipment is NOT shown here

P.P.E.

Base PPE

Materials

Pipe *(Section 908.02)*
Structure Backfill *(Section 904.05)*
Bituminous Mix *(Section 902)*
Rip-Rap *(Section 904.04)*
Geotextiles *(Section 918.02)*

Other References

- OSHA Safety and Health Standards for the Construction Industry: Subpart B - Excavations
- **Indiana811**: (800) 382-5544, http://indiana811.org/
- INDOT Standard Specifications *(Section 715)*
- Operations Memorandum 11-06 *(Environmental & Hydraulic Requirements for In-House Pipe Work)*

Sub Activities

Average Daily Production	35 Linear Feet	EFFECTIVE DATE	7/1/2013

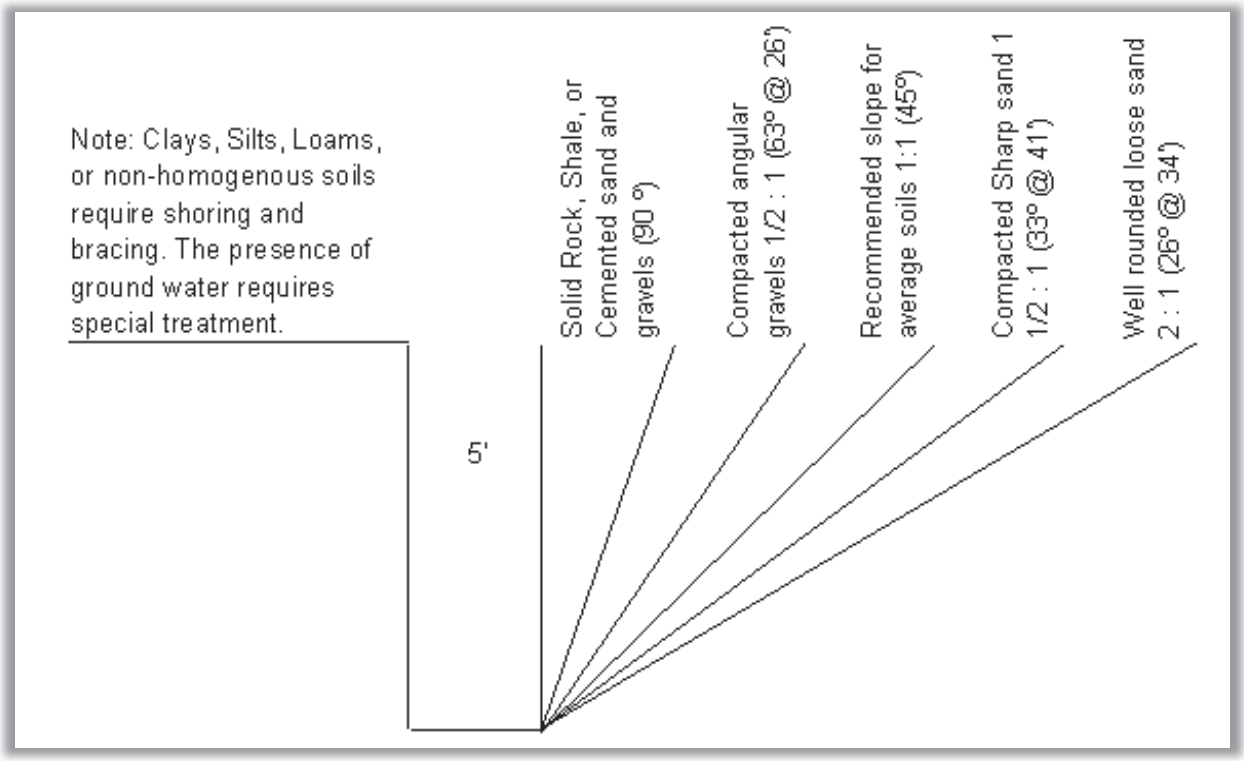
ACTIVITY	Culvert Replacement - Large Pipe (>36")	CODE	2332

Work Method

1. Place signs and safety devices
2. Cut pavement over pipe to be replaced
3. Excavate and remove pipe
4. Clean out and replace pipe bed to original grade
5. Place culvert in trench beginning at downstream end
6. Back fill over culvert
   - ✓ Use suitable structure backfill *(INDOT Standard Specifications: Section 904.05 Structure Backfill)* material and compact in layers not exceeding 6"
7. Place bituminous patch over excavation and compact.
   - ✓ Utilize work method and details from Activity 2020 (Deep Patch), but report work to 2332.
8. Dress side slopes, inlets, outlets and ditches
9. Remove signs and safety devices

Special Considerations

When trenching five feet deep or more slope angles should be constructed for safe operations as shown in the diagram below.



APPROVED BY

Director, Highway Maintenance

Average Daily Production	35 Linear Feet	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Pipe Lining - Small Pipe (≤36")	CODE	2336

Purpose

Due to deterioration, damage or deficiency of pipe to restore loss of adequate drainage and flow or structural integrity.

Category Roadway/Drainage

- ☒ **PM**
- ☒ **QA**
- ☒ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

- Activity should be evaluated based on the current condition of the pipe and any inspection findings (Activity 2320) or reported damages.
- Obtain necessary right-of-entry if insufficient right-of-way exists.
- Ensure appropriate hydraulic and environmental approvals have been obtained prior to the activity field work.
- Submit a request for locate services at least 2 days prior to any excavation
  - ***Indiana811:*** *(800) 382-5544, http://indiana811.org/*
- If a contractor is to grout annular space, then coordination and scheduling is to be considered prior to the activity field work. Grouting of pipe liners shall start within 14 calendar days of the pipe liner installation.

Reporting

Reporting Units Linear Feet

- Accomplishment is in the linear feet of installed pipe liner. Report all work to one Work Order including sign placement, sight preparation, material deliveries, installation, grouting, and finish grading.
- Report to the specific small culvert culvert assets.

NOTE:

1) This activity shall NOT include pipe liners installed into pipes greater than 36" in diameter. Pipe liner installed into pipes greater than 36" in diameter shall be reported to Activity 2337.
2) Pipe extensions shall be reported to Activity 2390 (Other Drainage Maintenance)

Crew Size

4 Workers

	QTY
Crew Leader	1
Excavator Operator	1
Truck Driver	1
Laborer	1

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Excavator/Backhoe	1
Dump Truck	2
Crew Cab	1
Concrete Mixer	1
Grout Pump	1

*Traffic Control Equipment is NOT shown here

P.P.E.

Base PPE

Materials

Pipe Liner *(INDOT Standard Specifications 907.25)*
PVC (Vent/Grout Tubes)
Lumber
Grout Cone
Concrete *(INDOT Standard Specifications 702)*
Cellular Grout *(INDOT Standard Specifications 725.07)*
Geotextile *(INDOT Standard Specifications 918.02)*
Riprap *(INDOT Standard Specifications 904.04)*

Other References

- Spec Book: Section 725 – Slip Lining of Existing Pipe
- Operations Memorandum 11-06 *(Environmental & Hydraulic Requirements for In-House Pipe Work)*

Sub Activities

820 - Gravity Flow Grouting Pipe Liner; *Grouting pipe using gravity flow method completed with in-house forces*

821 - Pressure Grouting Pipe Liner; *Grouting pipe using pressure grout pump equipment completed with in-house forces*

Average Daily Production	80 Linear Feet	EFFECTIVE DATE	7/1/2016

ACTIVITY	Pipe Lining - Small Pipe (≤36")	CODE	2336

Work Method

1) Place signs and safety devices
2) Inspect host pipe for any protrusions or debris and clean if necessary.
3) Clean area around pipe inlet or outlet, whichever end the liner will be pushed in from
4) Excavate channel back the length of the pipe liner section plus 25%
5) If necessary, fasten lumber blocking on the interior crown of the existing pipe to prevent the liner pipe from floating during grouting
6) Install vent tubes and grout tubes prior to installing liner
    (a) Fasten grout tubes, running 75%, 50%, and 25% of the total length of pipe, to crown of existing pipe every 20 feet using metal banding ***(See Figure 1 below)***
    (b) Strap vent tubes at three, nine and twelve o'clock at each of existing pipe, ensure the vent tubes are longer than the thickness of each header
7) Install liner pipe

    ****Be careful not to damage the ends or joints of pipe sections when installing pipe liner*
    (a) Install liner pipe sections with **female joint upstream**
    (b) Using a choker cable system, or sling, insert lead piece leaving about **4' of liner pipe sticking out of existing pipe**
    (c) When joining two liner pipes, install all manufacturer recommended components and adhesives prior to pushing liner pipe in the existing pipe
    (d) Lower next piece of liner pipe into place. Align male and female joint square with each other and pull together the 2 pieces using approved mechanical equipment
    (e) Visually inspect joint on inside and outside to assure joint is complete
    (f) **Do not leave tail-end of pipe unsupported**
    (g) On lead piece of pipe, release first holding cable
    (h) Using choker cable, or sling, advance pipe into existing pipe
8) Repeat steps until existing structure is completely lined
9) Construct bulkheads using concrete materials to seal off annular space at the outlet and inlet of each pipe
    (a) Contact vendor or contractor if grouting is to be done with external labor

    NOTE: Ensure vent and grout tubes are not plugged or restricted prior to grouting
10) Once bulkheads have cured, grout the annular space between the existing and liner pipes
    (a) **Gravity Flow** grouting is a method where cellular grout is delivered into the annular space through a cone inserted into a hole cut from the crown of the existing pipe.
        i. Cut a hole in the crown of the inlet side of the existing pipe, this hole should be large enough to host a grout cone
        ii. Insert a Grout Cone in the hole
        iii. Deliver grout into the annular space through the grout cone until the space is completely filled with grout.

(b) **Pressure grouting** is a method where cellular grout is delivered into the annular space via grout pumps and requires technical experience. This method requires specialized equipment and may require coordination with specialized technicians or vendors.

i. Pressure grouting should be delivered at the outlet side of structure through grout tubes placed during the install procedures
ii. Grout should be delivered through each of the grout tubes starting with the shortest grout tube and ending with the longest of the tubes
iii. Grout tubes and vent tubes should be plugged once grout is delivered past the point of the tubes extents
iv. Grouting should fill 100% of the annular space

11) After grouting, place riprap or other materials in ditch line or channel, as specified by the hydraulic analysis
12) Dress side slopes and ditch line or channel appropriately
13) Remove signs and safety devices

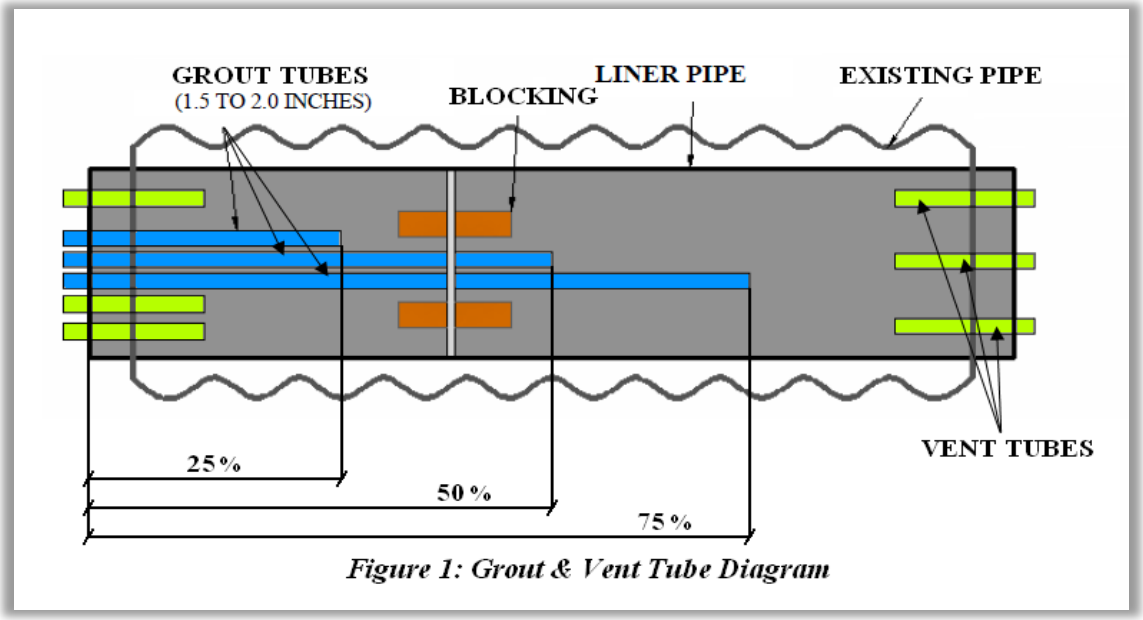


Figure 1: Grout & Vent Tube Diagram

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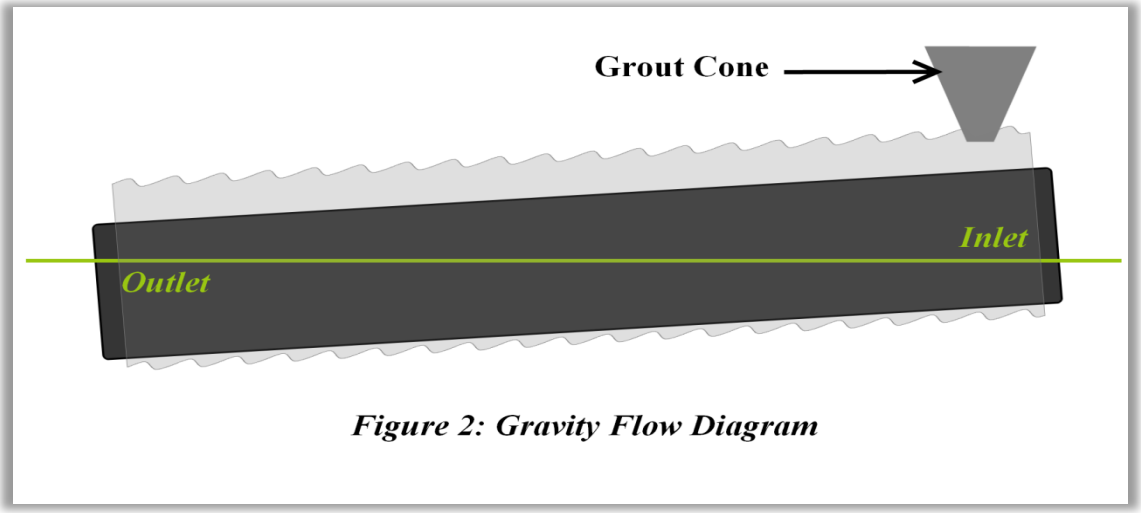

Figure 2: Gravity Flow Diagram

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Pipe Lining - Small Pipe (≤36")	CODE	2336

Special Considerations

- Materials for a liner may be more expensive than for a replacement pipe. A cost analysis should be done to determine if a liner is more economical than total pipe replacement. Factors to consider are size, depth, average daily traffic, traffic control, right-of-way, special equipment needs, and hydraulic capacity.

- Obtain necessary right-of-entry if insufficient right-of-way exists.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	80 Linear Feet	EFFECTIVE DATE	7/1/2016

INDIANA DEPARTMENT OF TRANSPORTATION (INDOT)

Activity 2336/2337 - Pipe Lining Quality Assurance Evaluation

District/ Sub district: _____ **Evaluation Date:** _____

Location : _____ **Route:** _____ **RP Start:** _____ **End:** _____

Date Project completed: _____ **Evaluated by:** _____

QA Type: 60-90 days (initial) None (follow-up) **Final Score:** 0%

OBSERVATIONS:

1 Pipe inlet is prepared

0 Ditch not cleaned for pipe installation

5 Ditch cleaned and open to pipe **Points 0.00**

2 Liner properly installed

0 Bowing or floating of pipe has occurred

10 Pipe liner is in proper positions **Points 0.00**

3 Pipe inlet and outlet properly grouted

0 Grout missing from inlet and/or outlet

10 Grout fully surrounding pipe insert on both ends **Points 0.00**

4 Voids adequately filled

0 Grout holes are not drilled or completely filled

5 Grout holes are only partly filled with grout

10 Grout holes are present and properly filled **Points 0.00**

5 Liner correct size for application **May refer to liner chart**

0 No

10 Yes **Points 0.00**

6 Inlet side- liner adequately fits existing pipe

0 Liner extends beyond ditch line and obstucts ditch flow

10 Liner extends beyond the pipe but not the ditch line

15 Liner does not extend beyond the pipe, and ditch line or liner extends beyond pipe and shoulder improved. **Points 0.00**

7 Outlet side- liner adequately fits existing pipe **Points 0.00**

0 Liner extends beyond ditch line and obstucts ditch flow

10 Liner extends beyond the pipe but not the ditch line

15 Liner does not extend beyond the pipe, and ditch line or liner extends beyond pipe and shoulder improved.

Activity 2336/2337 - Pipe Lining Quality Assurance Evaluation

Judgment of Evaluator (Evaluator's Comments Required)

TOTAL POINTS:

Observation #		1	2	3	4	5	6	7
Points	75	5	10	10	10	10	15	15

Rev 13-Jun

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Pipe Lining - Large Pipe (>36")	CODE	2337

Purpose

Due to deterioration, damage or deficiency of pipe to restore loss of adequate drainage and flow or structural integrity.

Category Roadway/Drainage

- ☒ **PM**
- ☒ **QA**
- ☒ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

- Activity should be evaluated based on the current condition of the pipe and any inspection findings (Activity 2320) or reported damages.
- Obtain necessary right-of-entry if insufficient right-of-way exists.
- Ensure appropriate hydraulic and environmental approvals have been obtained prior to the activity field work.
- Submit a request for locate services at least 2 days prior to any excavation
  - o ***Indiana811:*** *(800) 382-5544, http://indiana811.org/*
- If a contractor is to grout annular space, then coordination and scheduling is to be considered prior to the activity field work. Grouting of pipe liners shall start within 14 calendar days of the pipe liner installation.

Reporting

Reporting Units Linear Feet

- Accomplishment is in the linear feet of installed pipe liner. Report all work to one Work Order including sign placement, sight preparation, material deliveries, installation, grouting, and finish grading.
- Report to the specific small culvert or large culvert assets.

NOTE:

1) This activity shall NOT include pipe liners installed into pipes less than or equal to 36" in diameter. Pipe liner installed into pipes less than or equal to 36” in diameter shall be reported to Activity 2336.
2) Pipe extensions shall be reported to Activity 2390 (Other Drainage Maintenance)

Crew Size — **4** Workers

	QTY
Crew Leader	1
Excavator Operator	1
Truck Driver	1
Laborer	1

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Excavator/Backhoe	1
Dump Truck	2
Crew Cab	1
Concrete Mixer	1
Grout Pump	1

*Traffic Control Equipment is NOT shown here

P.P.E.

Base PPE

Materials

Pipe Liner *(INDOT Standard Specifications 907.25)*
PVC (Vent/Grout Tubes)
Lumber
Grout Cone
Concrete *(INDOT Standard Specifications 702)*
Cellular Grout *(INDOT Standard Specifications 725.07)*
Geotextile *(INDOT Standard Specifications 918.02)*
Riprap *(INDOT Standard Specifications 904.04)*

Other References

- Spec Book: Section 725 – Slip Lining of Existing Pipe
- Operations Memorandum 11-06 *(Environmental & Hydraulic Requirements for In-House Pipe Work)*

Sub Activities

820 - Gravity Flow Grouting Pipe Liner; *Grouting pipe using gravity flow method completed with in-house forces*

821 - Pressure Grouting Pipe Liner; *Grouting pipe using pressure grout pump equipment completed with in-house forces*

Average Daily Production	50 Linear Feet	EFFECTIVE DATE	7/1/2016

ACTIVITY	Pipe Lining - Large Pipe (>36")	CODE	2337

Work Method

1) Place signs and safety devices
2) Inspect host pipe for any protrusions or debris and clean if necessary.
3) Clean area around pipe inlet or outlet, whichever end the liner will be pushed in from
4) Excavate channel back the length of the pipe liner section plus 25%
5) If necessary, fasten lumber blocking on the interior crown of the existing pipe to prevent the liner pipe from floating during grouting

   Lumber blocking should be used when the annular space is greater than 4" and the diameter of the existing pipe is greater than 48"
6) Install vent tubes and grout tubes prior to installing liner
   (a) Fasten grout tubes, running 75%, 50%, and 25% of the total length of pipe, to crown of existing pipe every 20 feet using metal banding ***(See Figure 1 below)***
   (b) Strap vent tubes at three, nine and twelve o'clock at each of existing pipe, ensure the vent tubes are longer than the thickness of each header
7) Install liner pipe

   ****Be careful not to damage the ends or joints of pipe sections when installing pipe liner*
   (a) Install liner pipe sections with **female joint upstream**
   (b) Using a choker cable system, or sling, insert lead piece leaving about **4' of liner pipe sticking out of existing pipe**
   (c) When joining two liner pipes, install all manufacturer recommended components and adhesives prior to pushing liner pipe in the existing pipe
   (d) Lower next piece of liner pipe into place. Align male and female joint square with each other and pull together the 2 pieces using approved mechanical equipment
   (e) Visually inspect joint on inside and outside to assure joint is complete
   (f) **Do not leave tail-end of pipe unsupported**
   (g) On lead piece of pipe, release first holding cable
   (h) Using choker cable, or sling, advance pipe into existing pipe
8) Repeat steps until existing structure is completely lined
9) Construct bulkheads using concrete materials to seal off annular space at the outlet and inlet of each pipe
   (a) Contact vendor or contractor if grouting is to be done with external labor

   NOTE: Ensure vent and grout tubes are not plugged or restricted prior to grouting
10) Once bulkheads have cured, grout the annular space between the existing and liner pipes
   (a) **Gravity Flow** grouting is a method where cellular grout is delivered into the annular space through a cone inserted into a hole cut from the crown of the existing pipe.
      i. Cut a hole in the crown of the inlet side of the existing pipe, this hole should be large enough to host a grout cone
      ii. Insert a Grout Cone in the hole
      iii. Deliver grout into the annular space through the grout cone until the space is completely filled with grout.

(b) **Pressure grouting** is a method where cellular grout is delivered into the annular space via grout pumps and requires technical experience. This method requires specialized equipment and may require coordination with specialized technicians or vendors.

i. Pressure grouting should be delivered at the outlet side of structure through grout tubes placed during the install procedures
ii. Grout should be delivered through each of the grout tubes starting with the shortest grout tube and ending with the longest of the tubes
iii. Grout tubes and vent tubes should be plugged once grout is delivered past the point of the tubes extents
iv. Grouting should fill 100% of the annular space

11) After grouting, place riprap or other materials in ditch line or channel, as specified by the hydraulic analysis
12) Dress side slopes and ditch line or channel appropriately
13) Remove signs and safety devices

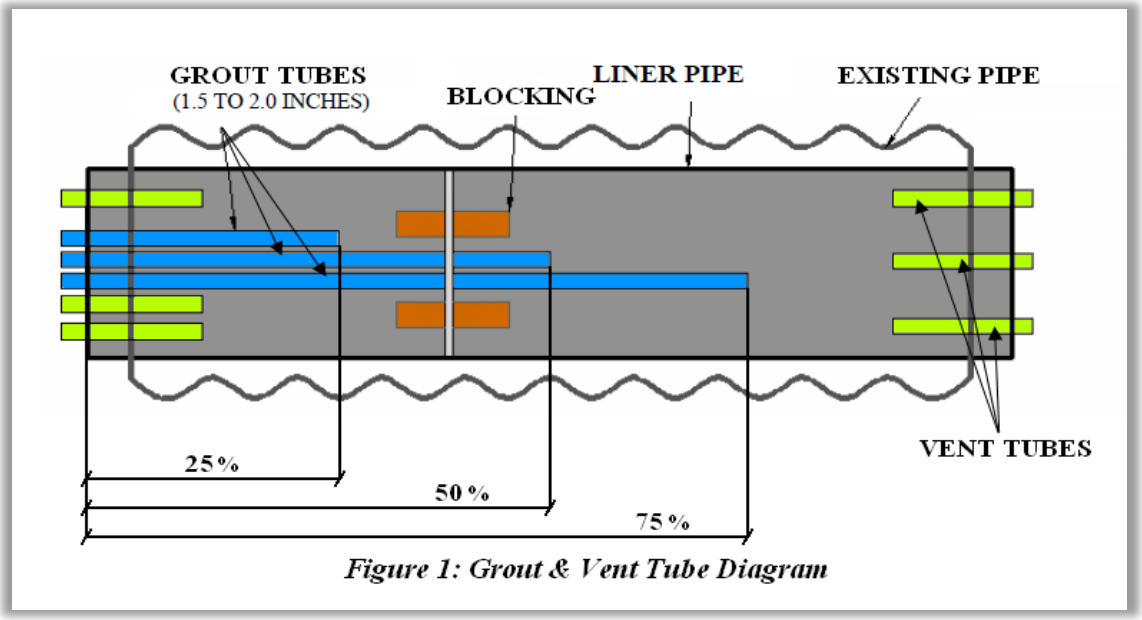

Figure 1: Grout & Vent Tube Diagram

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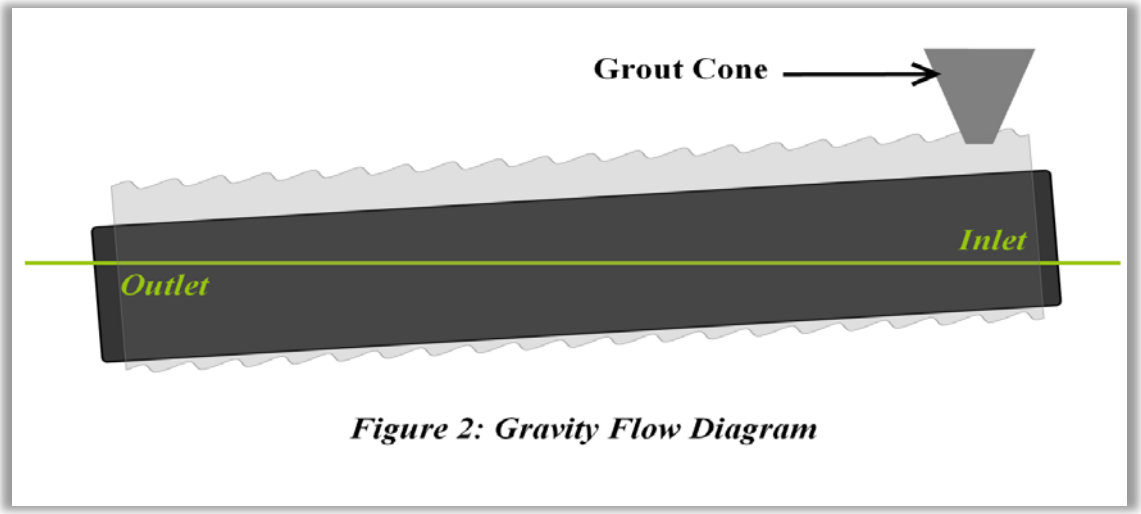


Figure 2: Gravity Flow Diagram

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Pipe Lining - Large Pipe (>36")	CODE	2337

Special Considerations

- Materials for a liner may be more expensive than for a replacement pipe. A cost analysis should be done to determine if a liner is more economical than total pipe replacement. Factors to consider are size, depth, average daily traffic, traffic control, right-of-way, special equipment needs, and hydraulic capacity.

- Obtain necessary right-of-entry if insufficient right-of-way exists.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	50 Linear Feet	EFFECTIVE DATE	7/1/2016

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Manual Drain Cleaning	CODE	2350

Purpose

Manually clean drains of debris (leaves, ice, dirt or other debris) from drains or inlets to maintain proper drainage.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

- Work can be performed throughout the year, typically after heavy rain or snow events.

Reporting | **Reporting Units** Structures

- Accomplishment is the total drains cleaned
- Mechanically cleaning a pipe, catch basin, or other drainage structure is reported to Activity 2351.
- Cleaning of paved side ditches is reported to Activity 2390, Subactivity 819

Crew Size 2 Workers

	QTY
Laborer	2

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

	QTY
Hand tools (shovel/rake)	1

*Traffic Control Equipment is NOT shown here

P.P.E.

Base PPE

Materials

Other References

Sub Activities

Average Daily Production	40 - 50 Drains	EFFECTIVE DATE	4/1/2015

WORK PERFORMANCE STANDARD

ACTIVITY	Manual Drain Cleaning	CODE	2350

Work Method

1) Set up safety devices
2) Observe appropriate safety precautions
3) Remove debris from drain grate and inlet
4) Load and haul debris and excess material away from worksite. Dispose of in a proper manner.
5) Remove signs and safety devices

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	40 - 50 Drains	EFFECTIVE DATE	4/1/2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Mechanical Small Structure Cleaning	CODE	2351

Purpose

Mechanically clean small structures (<20' span) (i.e. box culverts, pipes, and catch basins) with a sewer jet, vacuum truck, back hoe or other mechanical means to maintain adequate drainage.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

- Activity should be in coordination with recorded deficiencies identified in Activity 2320 (Small Culvert Inspection), Large Culvert Deficiency Reports, or as necessary to maintain adequate drainage.
- Designated disposal areas should be identified prior to the operation. If disposed of on private property, utilize the "Excavation Material Disposal Site" form.

Reporting

Reporting Units Structures

- Accomplishment is the total structures cleaned
- Report to the specific small culvert or large culvert assets.
- This activity should be reported in WMS to the specific asset cleaned, ensure that the correct Inventory Asset(s) is selected when completing the work order.
- This activity is reported by the total number of Structures (also known as Inventory Assets) cleaned.
- Cleaning leaves, snow & ice or other debris from inlets is reported to Activity 2350, Manual Drain Cleaning.
- Cleaning of paved side ditches is reported to Activity 2390, Subactivity 819

Crew Size	4 Workers	QTY
Laborer		1
Loader/Backhoe Operator		1
Vacuum Truck Operator		1
Truck Driver		1

*Traffic Control Personnel are NOT shown here

P.P.E.

Base PPE

Materials

Job Specific Equipment	QTY
Vacuum Truck	1
Loader/Backhoe	1
Dump Truck	1

*Traffic Control Equipment is NOT shown here

Other References

Sub Activities

Average Daily Production	15 - 20 Structures	EFFECTIVE DATE	4/1/2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Mechanical Small Culvert Cleaning	CODE	2351

Work Method

1) Place signs and safety devices
2) Remove debris and undesirable vegetation from inlet and outlet channels and restore inlet and outlet ditch flow lines
3) Clean out debris and silt from structure with sewer jet, vacuum truck, back hoe or other mechanical means.
4) Correct any eroded areas around the inlet and outlet pipes and paved ditches
5) Load and haul debris and excess material to designated disposal area
6) Clean work area
7) Remove signs and safety devices

Special Considerations

- Designated disposal areas should be identified prior to the operation

APPROVED BY

Director, Highway Maintenance

Average Daily Production	15 - 20 Structures	EFFECTIVE DATE	4/1/2015

Indiana Department of Transportation
Highway Maintenance Division
Excavation Material Disposal Site

A. Site Information

1. Name of the Property Owner: _____
2. Address/location of the Site: _____
   _____
3. Material to be disposed of at the Site: _____ Amount: _____
4. Date(s) of disposal operations: _____ to _____
5. Intended material use: _____
6. Environmental Impacts:
   a. Will there be impacts to wetlands or waters of the US at the Site? ☐ Yes ☐ No
   b. Is the Site in a Floodway? ☐ Yes ☐ No
   c. Will more than one acre of land at the Site be disturbed by disposal activities? ☐ Yes ☐ No
7. Comments:
   _____
   _____
8. Site Drawing: (*In the space below, include a sketch of the proposed Site, including where material is being dumped and used, as well as the closest waterway, if it can be seen. i.e. 500 feet north of limestone branch,*)

B. Certification

The Property Owner hereby certifies that the proposed disposal site, as described above, is in accordance with all local, state, and federal laws and that the Property Owner will only perform those operations at the site that are permitted and the material will be used only as stated above.

Signature of Property Owner: _____ Date: _____

Signature of Unit Foreman: _____ Date: _____

Signature of Subdistrict Manger: _____ Date: _____

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Underdrain Cleaning & Inspection	CODE	2360

Purpose

Clean inside and outside of underdrain outlet pipes to restore adequate drainage flow from pavement subsurface. Damaged or missing rodent screens shall also be replaced to ensure peak performance of drainage. Visual inspections of the underdrain components will also ensure deficiencies are recorded and accounted for.

Category Roadway/Drainage

- ☒ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

- Schedule throughout the year when weather permits complete and thorough cleaning and inspection of the drains.
- 100% of inventory is to be cleaned and inspected annually.

Reporting | **Reporting Units** Structures

- Accomplishment is the total number of underdrains inspected and cleaned
- Report to the specific underdrain assets.
- If any follow-up maintenance is required, complete an underdrain inspection form in WMS detailing the necessary repairs within 30 days of inspection date.

Crew Size	2-3 Workers	QTY
Truck Driver / Laborer		2-3

*Traffic Control Personnel are NOT shown here

Job Specific Equipment	QTY
Drain pipe auger	1
Shovel	1
Tile spade	1
Flashlight	1

*Traffic Control Equipment is NOT shown here

P.P.E.

Base PPE

Materials

Rodent Screens*(INDOT Standard Specifications 718.02)*

Other References

Underdrain Cleaning & Inspection Form 2360-A

Sub Activities

Average Daily Production	50 Structures	EFFECTIVE DATE	1/1/2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Underdrain Cleaning & Inspection	CODE	2360

Work Method

1) Place signs and safety devices
2) Use hand shovel to remove undesirable vegetation and obstructions and to repair minor eroded areas
3) Remove the rodent screen and probe inside the pipe with drain auger to remove any debris inside the pipe
4) Visually inspect inside of outlet drain and outlet using flashlight
5) Replace the rodent screen
6) Record inventory and condition items on the Underdrain Cleaning & Inspection Form 2360-A
7) Remove signs and safety devices
8) If any follow-up maintenance is required, complete an underdrain inspection form in WMS detailing the necessary repairs.within 30 days of inspection date

Special Considerations

APPROVED BY
Director, Highway Maintenance

Average Daily Production	50 Structures	EFFECTIVE DATE	1/1/2015

Used with Activity 2360

Underdrain Inspection Field Form

ROAD: _____ **INSPECTOR(S):** _____

UNIT: _____ **DIRECTION OF TRAVEL:** ☐ Both (All) ☐ Inc (N/E) ☐ Dec (S/W)

DATE: _____ Page _____ of _____

GENERAL NOTES

1. All mile marker references should be entered to the nearest thousandth (0.001) of a mile by DMI.
2. Please make sure all coordinate data is collected using the WGS84 datum and in decimal degree format.
3. **Direction of Travel** is *South to North* or *West to East* **except for Divided Highways**
4. **Direction of Travel** on **Divided Highways** shall be the direction of the travel lanes being cleaned/inspected
5. Naming convention for Underdrain Assets shall be in accordance with the following:
   UDR - *'Route Name' - 'Start MP' - 'Direction' / 'Side of Road'* (Sample: UDR - I 164 - 0.07 - S/R)

	Inventory Asset Underdrain Name	Mile Marker (00.000)	X Coordinates (Longitude) (00.00000)	Y Coordinates (Latitude) (00.00000)	OUTLET LOCATION	RODENT SCREEN	UNDERDRAIN PIPE		INVENTORY UPDATE	Deficiencies / Observations
					Left / Right / Median	Is Installed	Condition	Successfully Cleaned	Add / Edit / Remove	
1						☐		☐		
2						☐		☐		
3						☐		☐		
4						☐		☐		
5						☐		☐		
6						☐		☐		
7						☐		☐		
8						☐		☐		
9						☐		☐		
10						☐		☐		
11						☐		☐		
12						☐		☐		
13						☐		☐		
14						☐		☐		
15						☐		☐		
16						☐		☐		
17						☐		☐		
18						☐		☐		
19						☐		☐		

Form: 2360-F *(Rev. 4-2014)*

Number of Underdrains Inspected/Cleaned = ☐

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Other Drainage Maintenance	CODE	2390

Purpose

Report drainage maintenance or repair that is not identified with a separate activity.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

- Schedule this work throughout the year as needed. Observe weather and temperature limitations for individual activities.
- District approval is required for installation/replacement of new driveway pipes.
- Submit a request for locate services at least 2 days prior to any excavation
  - o ***Indiana811:*** *(800) 382-5544, http://indiana811.org/*

Reporting | **Reporting Units** Person Hours

- Accomplishment is the total person hours worked
- Report to the specific drainage feature assets.
- Report to the specific drainage asset and not to the road section.
- Minor relocation of ditches, less than 200 feet of ditch relocation, shall be reported to **Activity 2311 (Spot Ditching)**
- **Review Sub-Activities and Work Method for specific reporting.**

Crew Size	Workers	QTY

Crew size determined by sub-activity which will be performed

P.P.E.

Base PPE

Materials

Materials determined by sub-activity which will be performed

Job Specific Equipment QTY

Job specific equipment determined by sub-activity which will be performed

Other References

Sub Activities

819- Cleaning paved side ditches
822 - Hand ditching
830 - Scour and washout repairs (<50 tons)
827 - Repair of minor drainage structures including paved side ditches
829 - Repair of SMALL culvert (<48")
826 - Repair of LARGE culvert (≥48")
828 - Repair of catch basin, grate, or inlet or outlet structures
824 - Installation of French drains
825 - ***Removal of unauthorized culvert pipes
823 - ***Installation of driveway pipe or other lateral pipe

****(Requires District approval)*

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2016

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Other Drainage Maintenance	CODE	2390

Work Method

Work method determined by sub-activity which will be performed:

819 - Cleaning paved side ditches

822 - Hand ditching

830 - Scour and washout repairs (washouts less than approximately 50 tons of material, larger repairs should be reported to Activity 2291)

827 - Repair of minor drainage structures including paved side ditches

829 - Repair of SMALL culvert (<48")

826 - Repair of LARGE culvert (≥48")

828 - Repair of catch basin, grate, or inlet or outlet structures

824 - Installation of French drains

825 - Removal of unauthorized culvert pipes *(Requires District Approval)*

823 - Installation of driveway pipe or other lateral pipe *(Requires District Approval)*

Minor relocation of ditches, less than 200 feet of ditch relocation at any single location, shall be reported to **Activity 2311 (Spot Ditching)**

Special Considerations

*** District approval for new pipe installation at a new location must be attached to the work order.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2016

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Bridge Cleaning	CODE	2410

Purpose

This activity is done to forestall the development of structural deficiencies caused by corrosion and deterioration, preserve bridge components susceptible to the elements, and prolong the performance of the structure. This is accomplished by cleaning bridge deck surfaces, expansion joints, drains, bridge seats, bearings, and sidewalks by sweeping, vacuuming, hand shoveling, and air blasting to remove accumulation of sand, chemicals, and debris.

Category Roadway/Drainage

- ☒ **PM**
- ☒ **QA**
- ☐ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

- Schedule in the spring following snow removal activities.
- Truss bridges should be cleaned twice per year, once in spring and once in fall.
- Activity 2440 (Bridge Flushing) is often done at the same time as this activity.

Reporting

Reporting Units Bridges

- Accomplishment is the total number of bridges cleaned.
- Report to the specific bridge asset each time the asset is cleaned.

Crew Size **4-6** Workers

	QTY
Truck Driver / Laborer	2
Laborer	2-4

*Traffic Control Personnel are NOT shown here

P.P.E.

- Base PPE
- Respiratory Protection (1 strap dust mask)

Materials

Job Specific Equipment

Air Compressor	1
Dump Truck	1
Sweeper/Broom/Vacuum Truck	1

*Traffic Control Equipment is NOT shown here

Other References

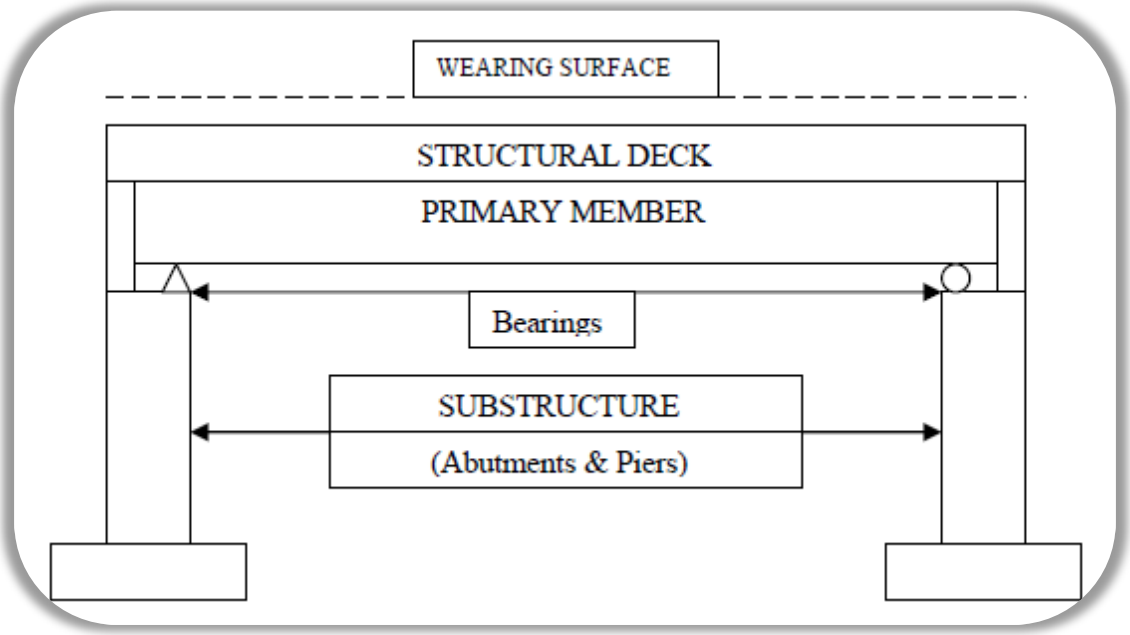
Sub Activities

Average Daily Production	4 - 7 Bridges	EFFECTIVE DATE	7/1/2016

ACTIVITY	Bridge Cleaning	CODE	2410

Work Method

1) Place signs and safety devices
2) Using Sweeper/Broom/Vacuum Truck equipment clean bridge deck surfaces
3) Use hand tools to loosen debris from joints, drains, gutter lines, sidewalks and other areas where dirt or debris has collected
4) Blow out joints, drains, truss members and other bridge components where debris has collected
5) Sweep or vacuum materials to be removed
6) Hand clean around bridge seats, mudwalls, bearing assemblies, beam ends and slopewalls
7) Load materials into haul vehicles
8) Dump waste materials at a designated dump location only
9) Remove signs and safety devices



Special Considerations

- Key components to clean are most often joints, drains, bearing assemblies, and bridge seats.
- If all of the bridges to be cleaned in a 7.5 hour time period have bridge seats, bearing assemblies, and beam ends which require cleaning the anticipated average daily production is 4 bridges. If none of the bridges to be cleaned in a 7.5 hour time period have bridge seats, bearing assemblies, and beam ends which require cleaning the anticipated average daily production is 7 bridges.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	4 – 7 Bridges	EFFECTIVE DATE	7/1/2016

INDIANA DEPARTMENT OF TRANSPORTATION (INDOT)

Activity 2410/2440 - Cleaning/Flushing Bridges

Quality Assurance Evaluation

District/ Sub district: _____ **Evaluation Date:** _____

WMS Location Code: _____ **Route:** _____ **RP Start:** _____ **End:** _____

Date Project completed: _____ **Evaluated by:** _____

QA Type: 1 Month (initial) (no follow-up) **Final Score:** **#VALUE!**

OBSERVATIONS:

1 Joints and Drains

0 Joints and drains full of debris
3 Some joints and drains have debris
6 Joints and drains free of debris

	Br1	Br2	Br3	Avg
Points:	0	0	0	**0**

2 Truss Members

0 Truss Members full of debris
5 Some Truss Members have debris
10 All Truss Members are free of debris

	Br1	Br2	Br3	Avg
Points:	0	0	0	**0**

3 Abutments and Bearing Assemblies

0 Abutments and Bearing Assemblies have debris
4 Some amount of debris in Abutments and Bearing Assemblies
8 Abutments and Bearing Assemblies are free of debris

	Br1	Br2	Br3	Avg
Points:	0	0	0	**0**

4 Bridge Side Slopes/Slope Walls

0 Side Slopes and Slope Walls are full of debris
3 Some Slope And Slope Walls have debris
6 Bridge Side Slopes/Slope Wall are free of debris

	Br1	Br2	Br3	Avg
Points:	0	0	0	**0**

5 Debris Disposal

0 Debris found thrown on side of bridge
4 No debris found on side of bridge

	Br1	Br2	Br3	Avg
Points:	0	0	0	**0**

6 Gutter Lines

0 Debris found in gutter line of bridge
6 No debris found in gutter line of bridge

	Br1	Br2	Br3	Avg
Points:	0	0	0	**0**

cont.2

Activity 2410/2440 - Cleaning & Flushing Quality Assurance Evaluation
Page 2

Judgment of Evaluator (Evaluator's Comments Required) **continue**

TOTAL POINTS: **#VALUE!**

Scoring Matrix

Final Score	6	5	4	3	2	1
Points	50					

Draft -2/6

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Bridge Flushing	CODE	2440

Purpose

This activity is done to forestall the development of structural deficiencies caused by corrosion and deterioration, preserve bridge components susceptible to the elements, and prolong the performance of the structure. This is accomplished by cleaning bridge deck surfaces, expansion joints, drains, bridge seats, bearings, and sidewalks by washing with water to remove accumulation of sand, chemicals, and debris.

Category Roadway/Drainage

- ☒ **PM**
- ☒ **QA**
- ☐ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

- Schedule in the spring following snow removal activities.
- Truss bridges should be cleaned twice per year, once in spring and once in fall.
- Activity 2410 (Bridge Cleaning) can be scheduled in conjunction with this activity.

Reporting

Reporting Units Bridges

- Accomplishment is the total number of bridges flushed.
- Report to the specific bridge asset each time the asset is cleaned.

Crew Size	5 Workers	QTY
Truck Driver/Laborer		1
Laborer		4

*Traffic Control Personnel are NOT shown here

Job Specific Equipment	QTY
Water Tank	1
Water Pump/Power Washer	1

*Traffic Control Equipment is NOT shown here

P.P.E.

- Base PPE
- Respiratory Protection (1 strap dust mask)

Materials

Other References

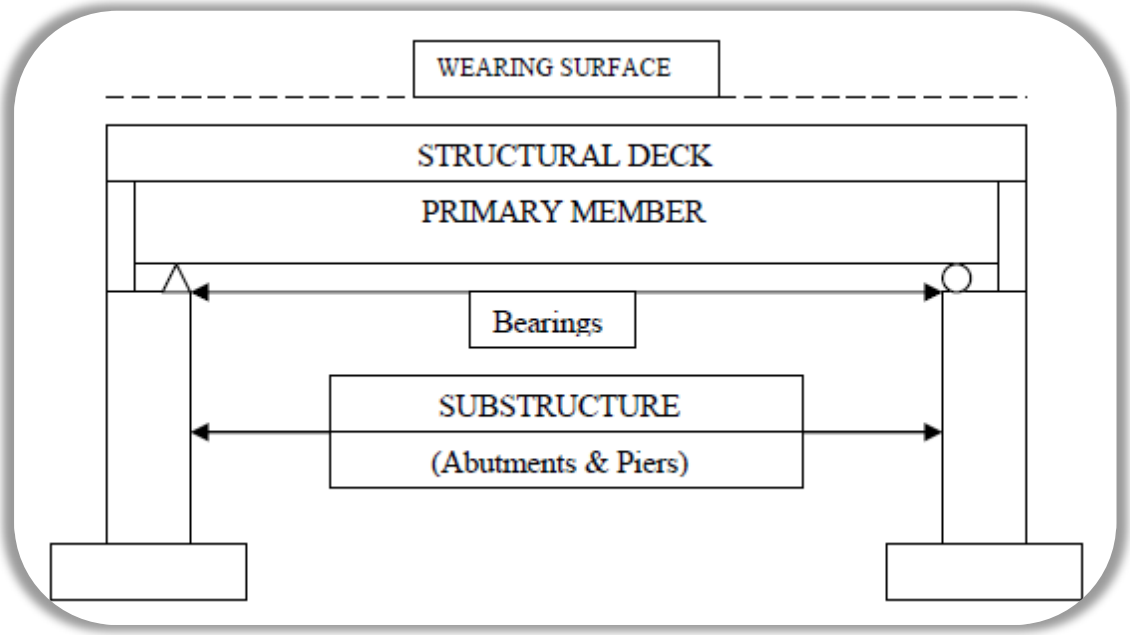
Sub Activities

Average Daily Production	4 - 8 Bridges	EFFECTIVE DATE	7/1/2016

ACTIVITY	Bridge Flushing	CODE	2440

Work Method

1) Place signs and safety devices
2) Using Water truck flush bridge deck surfaces
3) Using water pump/power washer complete the following:
   - ✓ Manually flush joints, drains, gutter lines, sidewalks, other areas of deck surface, and truss members
   - ✓ Manually flush around bridge seats, mudwalls, bearing assemblies, beam ends and slopewalls
4) Remove signs and safety devices



Special Considerations

- When using water tanks following winter activities, be sure tanks are free of chlorides and chemicals prior to this activity.
- Key components to flush are often joints, drains, bearing assemblies, and bridge seats.
- Water tanks should be filled from locations where INDOT has metered service.
- If all of the bridges to be flushed in a 7.5 hour time period have bridge seats, bearing assemblies, and beam ends which require flushing the anticipated average daily production is 4 bridges. If none of the bridges to be flushed in a 7.5 hour time period have bridge seats, bearing assemblies, and beam ends which require flushing the anticipated average daily production is 8 bridges.

	APPROVED BY
	Director, Highway Maintenance
Average Daily Production: 4 - 8 Bridges	EFFECTIVE DATE: 7/1/2016

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Temporary Bridge Deck Patching	CODE	2450

Purpose

Temporary patching is performed to reduce impact loading, reduce roadway hazards and until proper patching can be scheduled and weather conditions are conducive to a permanent patch. This activity will not result in any permanent patching solution on bridge decks. This is done by patching areas on bridge deck using hot or cold bituminous mixtures or other materials available which are not intended for permanent bridge deck patching.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

- Temporary patching is done when weather conditions and scheduling does not allow for Activity 2451 (Permanent Bridge Deck Patching) to be performed.
- This activity is one that is temporary as a result Activity 2451 (Permanent Bridge Deck Patching) should be scheduled when weather conditions are conducive to complete.

Reporting | **Reporting Units** Square Feet

- Accomplishment is reported in Square Feet of deck patched
- Report to the specific bridge asset each time this activity is performed.
- Once this activity has been completed a **Work Request** for **Activity 2451** (Permanent Bridge Deck Patching) shall be created by the **Subdistrict Manager** and assigned to appropriate Management Unit. Be sure the specific Bridge Asset is selected when creating the Work Request.

Crew Size	3-4 Workers	QTY
Truck Driver / Laborer		1
Laborer		2-3

*Traffic Control Personnel are NOT shown here

Job Specific Equipment	QTY
Blower / Air Compressor	1

*Traffic Control Equipment is NOT shown here

P.P.E.

Base PPE

Additional PPE per Safety Data Sheet

Materials

HMA Surface (Type B) *(INDOT Standard Specifications 902.01(a))*
Cold Mix Bituminous for Patching
Aggregate *(INDOT Standard Specifications 904)*
Liquid Bituminous *(INDOT Standard Specifications 902.01(b))*

Other References

Sub Activities

Average Daily Production	70 Square Feet	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Temporary Bridge Deck Patching	CODE	2450

Work Method

1) Place signs and safety devices
2) Remove dirt, debris and water from patch area with air compressor or blower
3) Place bituminous materials in distress or spalled areas of bridge deck
4) Compact material thoroughly by hand
5) Use straight edge after final compaction to ensure patch material is level and smooth with existing bridge deck
6) If sealer material is used, place sand on sealer
7) Remove signs and safety devices

NOTE:

Once this activity has been completed a **Work Request** for **Activity 2451** (Permanent Bridge Deck Patching) shall be created by the **Subdistrict Manager** and assigned to appropriate Management Unit. Be sure the specific Bridge Asset is selected when creating the Work Request.

Special Considerations

- This activity is usually completed to reduce hazards until proper patching can be scheduled and weather conditions are conducive to a permanent patch. This Activity will not result in any permanent patching solution on bridge decks.

- Once this activity has been completed a Work Request for Activity 2451 (Permanent Bridge Deck Patching) shall be created by the Subdistrict Manager and assigned to appropriate Management Unit. Be sure the specific Bridge Asset is select when creating the Work Request.

		APPROVED BY	
		Director, Highway Maintenance	
Average Daily Production	70 Square Feet	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Permanent Bridge Deck Patching	CODE	2451

Purpose

This activity is performed to permanently repair spalled, delaminated and other deficient areas of a bridge deck. This is done by patching areas on bridge deck using cementitious materials intended for permanent bridge deck patching.

Category Roadway/Drainage

- ☐ **PM**
- ☒ **QA**
- ☒ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

- This activity should be performed when weather conditions and scheduling allows.
- If Activity 2450 (Temporary Bridge Deck Patching) has been completed then the temporary materials should be replaced with permanent materials used when performing this activity.

Reporting

Reporting Units Square Feet

- Accomplishment is reported in Square Feet of deck patched
- Report to the specific bridge asset each time this activity is performed.

Crew Size 4-6 Workers

	QTY
Supervisor	1
Laborer	3-5

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

	QTY
Concrete Saw	1
Jack Hammer	2
Air Compressor	1
Concrete Mixer	1
Water Tank	1

*Traffic Control Equipment is NOT shown here

P.P.E.

Base PPE

Additional PPE per Safety Data Sheet

Materials

Rapid Setting Patch Materials/Cement *(INDOT Standard Specifications 901.07)*
Aggregate *(INDOT Standard Specifications 904)*

Other References

INDOT Standard Specifications:

- 722.06 Patching of the Bridge Floor
- 710.03 Patching Concrete Structures

Sub Activities

831 - Patching includes Bridge Expansion Joint

Average Daily Production	50 Square Feet	EFFECTIVE DATE	7/1/2013

ACTIVITY	Permanent Bridge Deck Patching	CODE	2451

Work Method

1) Place signs and safety devices
2) Identify and mark extent of damaged or failing concrete by sounding bridge deck
3) Saw cut 1" outside the deteriorated area using concrete saw (saw cuts should result in straight, smooth edges and patch should be of rectangular shape)

Partial Depth Patch

4) Hammer and remove deteriorated concrete using pneumatic hammers and hand tools to a minimum of 1" below rebar

Full Depth Patch

4) Form underside of deck for any Full-Depth repairs

NOTE:

Jack hammers shall not be heavier than nominal 45 lb class and chipping hammers shall not be heavier than nominal 15 lb class. Only chipping hammers shall be used when removing concrete within 1 in. of the reinforcement.

5) Periodically sound the remaining concrete to ensure deteriorated concrete is not left in place
6) Wire brush exposed rebar to remove rust and other contaminants
7) Clean the area using sandblasting, water-blasting, or air
8) Load and dispose materials in a designated and approved disposal area
9) Fasten additional reinforcing steel to the existing steel if section loss is 20% or greater
10) Apply bonding agent or epoxy coatings to surface as required
11) Mix and place cementitious patch materials

NOTE:

Follow manufacturer's mixing instructions. Mixing may vary depending on contents of bag, aggregates and weather conditions.

12) Finish and broom/tine patch materials surface
13) Scribe the month and year the patch was performed.
    - ✓ If the patch was placed in March of 2013, then the patch should be scribed with '*03 – 13*'
14) Allow patched area(s) to sufficiently cure before releasing traffic
15) Remove signs and safety devices

Special Considerations

- Jack hammers shall not be heavier than nominal 45 lb class and chipping hammers shall not be heavier than nominal 15 lb class. Only chipping hammers shall be used when removing concrete within 1 in. of the reinforcement.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	50 Square Feet	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION (INDOT)

Activity 2451 - Permanent Bridge Deck Patching

Quality Assurance Evaluation

District/ Sub district: _____ **Initial Evaluation Date:** _____

Follow-Up Evaluation Date: _____

WMS Location Code: **WO #** _____

Str #: _____ **Route:** _____ **RP:** _____

Date Project completed: _____ **Evaluated by:** _____

QA Type: *1 Month (initial), 1 Year (Follow-Up)* **Initial Score (%):** -

Follow-Up Score (%): -

OBSERVATIONS:

			Follow-Up
1	**Patch squared with adjacent concrete** *(exclude areas < 1')*	**Available Points:**	
	0 More than 1 side not squared		
	5 1 side not squared		
	10 All sides squared	**Points:**	
2	**Patch covers distressed area**	**Available Points:**	
	0 More than 1 side		
	7 1 side		
	14 All sides	**Points:**	
3	**Was a cementious material used**	**Available Points:**	
	0 No		
	18 Yes	**Points:**	
4	**All deficient areas patched**	**Available Points:**	
	0 There are many areas in the **SAME** lane not completed.		
	5 Some areas in **OTHER lanes** were not patched		
	25 Yes, all deficient areas have been patched	**Points:**	
5	**Disposal of excavated materials**	**Available Points:**	
	0 Excavated materils found on site		
	3 No excavated materials found	**Points:**	
6	**Joint Material in state of good repair**	**Available Points:**	
	0 Joint material not maintained or replaced, left open & not sealed		
	6 Joint material mainted or replaced, sealed		
	N Patching did not affect the joint material; or No joint present	**Points:**	
7	**Patch perfomance**	**Available Points:**	
	0 Not working well, cracking, spalling or loose material visable		
	10 Yes, patching material is in place and no signs of defects	**Points:**	

Str #: - **Date Project completed:** - **Evaluated by:** -

Activity 2451 Permanent Bridge Deck Patching Quality Assurance Evaluation

Judgment of Evaluator *(Evaluator's Comments Required)* _____

Intial Observations *(1 Month)*

Observation #	1	2	3	4	5	6	7	Total
Available Points								
Average QA Scored	-	-	-	-	-	-	-	-

TOTAL POINTS: -

Follow-Up Observations *(1 Year)*

Observation #	2	4	6	7	Total
Available Points					
Average QA Scored	-	-	-	-	-

TOTAL POINTS: -

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Bridge Deck Crack Filling	CODE	2470

Purpose

This activity is performed to seal bridge deck cracks to prevent intrusion of water and chlorides into bridge deck or overlay.

Category Roadway/Drainage

- ☒ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

- The work should be performed in March, April, May, September, and October weather permitting with temperatures above 40 degrees and below 90 degrees.
- A list of bridges to be scheduled should be provided by Technical Services and the District Bridge Asset Engineer.

Reporting | **Reporting Units** Square Feet

- Accomplishment is reported in Square Feet of deck treated
- Report to the specific bridge asset each time this activity is performed.

Crew Size — **4** Workers

	QTY
Crew Leader	1
Laborer	3

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

	QTY
Crew Cab	1
Air Compressor	1

*Traffic Control Equipment is NOT shown here

P.P.E.

Base PPE

Additional PPE per Safety Data Sheet

Materials

Epoxy *
Modified Epoxies *
Methyl Methacrylates *
High Molecular Weight Methacrylates *
Polyester *

*Materials may vary based on Engineer's recommendations

Other References

Sub Activities

Average Daily Production	10,000 – 15,000 Sq Ft	EFFECTIVE DATE	4/1/2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Bridge Deck Crack Filling	CODE	2470

Work Method

1) Place signs and safety devices

2) Deck should be relatively dry; some dampness is permissible but no standing water.

3) Using compressed air, blow cracks out.

4) Make sure area around cracks are clean by removing dirt and debris.

5) Material should be poured along crack in a thin bead.

6) Allow product to seep into crack for 10 to 15 minutes.
   - ✓ If necessary, repeat application.

7) Allow material to dry and if necessary apply sand to the surface to blot excess material to prevent tracking by traffic.

8) Remove signs and safety devices.

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	10,000 – 15,000 Sq Ft	EFFECTIVE DATE	4/1/2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Bridge Deck Broadcast Sealing	CODE	2471

Purpose

This activity is performed to seal concrete on bridge deck to prevent intrusion of water and chlorides into bridge deck or overlay.

Category Roadway/Drainage

- ☒ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

- The work should be performed in March, April, May, September, and October weather permitting with temperatures above 40 degrees and below 90 degrees.
- A list of bridges to be scheduled should be provided by Technical Services and the District Bridge Asset Engineer.

Reporting

Reporting Units Square Feet

- Accomplishment is reported in Square Feet of deck treated
- Report to the specific bridge asset each time this activity is performed.

Crew Size — **4** Workers

	QTY
Crew Leader	1
Laborer	3

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

	QTY
Crew Cab	1
Air Compressor	1

*Traffic Control Equipment is NOT shown here

P.P.E.

Base PPE

Additional PPE per Safety Data Sheet

Materials

Silane *
Siloxane *

*Materials may vary based on Engineer's recommendations

Other References

Sub Activities

Average Daily Production	10,000 – 15,000 Sq Ft	EFFECTIVE DATE	4/1/2015

ACTIVITY	Bridge Deck Broadcast Sealing	CODE	2471

Work Method

1) Place signs and safety devices

2) Review application documentation from vendor documentation to identify difference in surface prep, application rates, and mixing instructions.

3) Ensure concrete surfaces are clean and completely dry.
   - ✓ Concrete surfaces must be clean, dry and free of oil, dirt, loose scale and any other contaminants. Surfaces shall be swept clean by hand or by mechanical means. Remove oil and grease as completely as possible.
   - ✓ If water is necessary to removed oil, dirt, loose scale, or other contaminants then high pressure power washing is recommended.

4) Blow off any loose particles with compressed air before applying sealing materials, and wash any oil

5) Cover expansion devices or other features that are not to be sealed over.

6) Material can be poured directly onto the surface or applied by other means. Uniformly distribute product around the deck surface, making sure to not leave any puddles.
   - ✓ Broom parallel along existing tine markings to make sure that material does not fill in tining texturing.
   - ✓ Frequently go back and broom out any puddles that may redevelop.

7) Allow product to stand until completely dry before turning traffic onto the surface.
   - ✓ If necessary, apply sand to the surface while material is still tacky, to help blot excess material, prevent tracking and improve short-term skid resistance.
   - ✓ This is especially recommended in higher traffic volume areas where decks are worn smooth or where braking action may be anticipated.

8) Clean equipment often and completely in order to reduce buildup.

9) Remove signs and safety devices.

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	10,000 – 15,000 Sq Ft	EFFECTIVE DATE	4/1/2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Other Bridge Maintenance	CODE	2490

Purpose

Complete other bridge maintenance or repair that is not identified with a separate activity.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule this work throughout the year as needed. Observe weather and temperature limitations for individual activities.

Reporting | **Reporting Units** Person Hours

- Accomplishment is the total person hours worked.
- Report to the specific bridge asset each time this activity is performed.

Crew Size | Workers | **QTY**

Crew size determined by sub-activity being performed

P.P.E.

PPE determined by sub-activity to which will be performed

Materials

Materials determined by sub-activity to which will be performed

Job Specific Equipment **QTY**

Job specific equipment determined by sub-activity being performed

Other References

Sub Activities

835 - Joint REPLACEMENT

836 - Repair joint material

830 - Scour repair (Rip Rap placement)

834 - Graffiti Removal

840 - Replacing rip rap

837 - Repair of slopewall

839 - Repair to traffic safety component (handrail, sidewalk, guardrail attachments, bridge barrier)

838 - Repair to drainage component (curb and gutter, drains, drain extensions)

832 - Bearing Assembly / Bridge Seat repair (bearing lubrication, reset bearings, mudwall repair, seal abutment)

833 - Channel maintenance (log jam removal, debris removal, etc.)

940 – Bridge Approach Repair

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Other Bridge Maintenance	CODE	2490

Work Method

Work method determined by sub-activity to which will be performed:

835 - Joint REPLACEMENT

836 - Repair joint material

830 - Scour repair (Rip Rap placement)

834 - Graffiti Removal

840 - Replacing rip rap

837 - Repair of slopewall

839 - Repair to traffic safety component (handrail, sidewalk, guardrail attachments, bridge barrier)

838 - Repair to drainage component (curb and gutter, drains, drain extensions)

832 - Bearing Assembly / Bridge Seat repair (bearing lubrication, reset bearings, mudwall repair, seal abutment)

833 - Channel maintenance (log jam removal, debris removal, etc.)

Special Considerations

- Obtain necessary right-of-entry if insufficient right-of-way exists.
- Ensure appropriate hydraulic and environmental approvals have been obtained prior to the activity field work.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Noise Wall Repair	CODE	2510

Purpose

To maintain or restore proper functioning of noise wall. Includes graffiti removal, greasing hinges on doors, minor patching, and panel or beam replacement.

Category Right-of-Way

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule work as required throughout the year. Damage that is hazardous to traffic should be repaired as soon as possible.

Reporting | **Reporting Units** Person Hours

Work is reported in person hours. Note specific work being performed in the comment section.

This activity does NOT include repair to concrete barrier wall - report this type work to Activity 2590.

Crew Size **2-3 Workers**

	QTY
Laborers	2-3

*Traffic Control Personnel are NOT shown here

P.P.E.

1. Base PPE

Materials

Dependent upon specific work being performed

Job Specific Equipment

Dependent upon specific work being performed.

Other References

INDOT RSP 620-R-483 “Sound Barrier System”

Sub Activities

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Noise Wall Repair	CODE	2510

Work Method

1. Set up appropriate traffic control
2. Clean up any debris
3. Perform work as required
4. Properly dispose of debris
5. Remove traffic control

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Cable Barrier Repair	CODE	2530

Purpose

To restore safe driving conditions due to accident damage, vandalism, or normal deterioration. Includes repair, realignment, removal, replacement, or retensioning of cable barrier posts and components.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule this work as required throughout the year. Damage will typically be higher in the winter months as barrier is hit due to vehicle slide-offs.

Damage should be repaired as soon as possible. Damaged posts or anchors will not allow the system to perform properly.

Reporting | **Reporting Units** Linear Feet

Accomplishment is reported as the linear feet of cable between consecutive damaged posts. Cable retensioning only, such as if emergency responders have released an anchor, has 0 accomplishment. Note specific work performed in the comments.

Ensure accurate reporting of labor, materials, and equipment for Damage to State Property reimbursement.

Crew Size 2-3 Workers

	QTY
Laborer	2-3

*Traffic Control Personnel are NOT shown here

P.P.E.

1. Base PPE

Materials

Cable Barrier Posts (note specific system)

Mounting hardware (note specific system)

Cable

Job Specific Equipment

Cable spacer bar

*Traffic Control Equipment is NOT shown here

Other References

INDOT RSP 627-R-546

System specific plans (available at the Subdistrict or District Construction)

Sub Activities

Average Daily Production	240-320 Linear Feet	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Cable Barrier Repair	CODE	2530

Work Method

1. Place signs and other safety devices
2. Check for damaged parts. There may be damaged parts beyond the actual impact area.
3. Remove all debris and damaged parts
4. If a cable is broken, cut frayed/damaged sections from the ends and splice in a new section using turnbuckles
5. If foundations are damaged beyond use or misaligned, they will need to be replaced.
6. Install new posts in existing sleeves
7. Install cable onto posts with appropriate hardware to the system
8. Check tension with tension meter at nearest turnbuckle. Adjust turnbuckle until tension meter reads correct tension, per the vendor's tension chart. Note that tension is temperature dependent.
9. Ensure a yellow reflective sheeting delineator is placed on the traffic side of every fourth post
10. Clean up debris and work area
11. Remove signs and safety devices

Special Considerations

INDOT maintains an approved list of cable barrier systems. Ensure that the replacement parts match the existing system. INDOT has spare parts QPA's for each system, which list the specific parts.

If the system is impacted greater than 300 feet from a turnbuckle, make sure to check tension at the nearest turnbuckle in both directions.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	240-320 Linear Feet	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF OPERATIONS SUPPORT

PERFORMANCE STANDARD

ACTIVITY	Impact Attenuator/Guardrail End Treatment Repair	CODE	2550

Purpose

To restore safe driving conditions due to accident damage, vandalism, or normal deterioration of the unit. Includes repair, realignment, removal, replacement, or installation of a new unit.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule this work as required throughout the year. Damage that is hazardous to traffic should be repaired within 48 hours.

Reporting | **Reporting Units** Units

Accomplishment is the number of units repaired. Report the specific unit to the appropriate subactivity.

Report accomplishment to the specific attenuator or end treatment inventory asset.

If an attenuator/end treatment is being removed only, and not replaced or repaired, report as an accomplishment with good notes in the comments section as to why the unit is not being replaced.

Report routine inspections to Activity 2551.

Report guardrail repair to Activity 2580.

Crew Size **2-3 Workers**

	QTY
Laborers	2-3

(at least one crewmember shall be certified on the unit being repaired)

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Trailer

*Traffic Control Equipment is NOT shown here

P.P.E.

Base PPE

Materials

Attenuator replacement parts

Guardrail End Treatment replacement parts

Other References

INDOT Spec 601

Indiana Design Manual Chapter 49-8.0

Operating Procedure 6

System specific plans and manuals

Sub Activities

50 - QUADGUARD (Attenuator)	54 - Sentre (Guardrail End)	58 - TRACC (Attenuator)
51 - GREAT (Attenuator)	55 - Barrel Array (Attenuator)	559 - SCI 100 GM (Attenuator)
52 - CAT (Guardrail End)	56 - Breakmaster (Guardrail End)	60 - ADIEM (Attenuator)
53 - ET 2000/ET Plus (Guardrail End)	57 - Hexfoam Sandwich (Attenuator)	69 - REACT
561 - TAU II (Attenuator)	159 - SKT 350 (Guardrail End)	565 - FLEAT MT

Average Daily Production	1 - 2 Units	EFFECTIVE DATE	7/1/2016

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF OPERATIONS SUPPORT

PERFORMANCE STANDARD

ACTIVITY	Impact Attenuator/Guardrail End Treatment Repair	CODE	2550

Work Method

1. Place signs and safety devices
2. Clean up and remove all debris and accident damage
3. Inspect for damaged parts - note there may be damaged parts away from the actual impact area
4. Remove all damaged parts
5. Reset the unit per manufacturer's recommendations
6. Replace all damaged parts
7. Inspect unit to ensure proper installation
8. Place appropriate delineation markings on nose
8. Remove all tools and debris
9. Remove signs and other safety devices

Special Considerations

Guardrail end treatments or impact attenuators should typically not be removed unless a designer has reviewed the location and determined the unit is no longer necessary.

Repair or installation shall be conducted under supervision of a person certified by the manufacturer for the unit being worked on. Ensure all bolts are torqued to the manufacturer's recommendations.

INDOT maintains an approved list of impact attenuators and guardrail end treatments. Ensure that the replacement parts match the existing system. INDOT has repair parts QPA's for each unit which list the specific parts. If a unit is being completely replaced, a different brand may be installed that is appropriate for the location.

Obsolete units (those no longer on the approved list) may continue to be maintained for their usable life. This includes routine and minor maintenance (nose piece, cartridges). Obsolete units requiring more substantial repairs should be replaced with a unit on the current approved materials list that is appropriate for that location.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	1 - 2 Units	EFFECTIVE DATE	7/1/2016

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Impact Attenuator/Guardrail End Treatment Inspection	CODE	2551

Purpose

To ensure proper function of units after new installation or routine walk-up inspection to monitor for damage or deterioration. Ensure unit is installed per manufacturer's requirements, components are in working condition, bolts are properly torqued, there is no damage, and check for age-related deterioration.

Category Roadway/Drainage

- ☒ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule throughout the year per the frequency in the work method, or when called upon by Construction to inspect a contract installation.

All attenuators and guardrail end treatments should have drive-by inspections performed to look for evidence of impact damage as part of the foreman's routine road patrols

Reporting | **Reporting Units** Units

Accomplishment is the number of units inspected during a walk-up inspection.

Report to the inventory asset, and note any needed repairs in the comment section. Create a Work Request for Activity 2550 for any needed repairs identified. Scan and attach inspectin form to the work order.

Major repair of units is reported to Activity 2550.

Routine drive-by inspections are not reported to this activity.

Crew Size **2 Workers**

	QTY
Laborer	2

P.P.E.

Base PPE

Materials

Job Specific Equipment

Other References

INDOT Spec 601

Indiana Design Manual Chapter 49-8.0

System specific plans and manuals

Sub Activities

Average Daily Production	15 - 25 Units	EFFECTIVE DATE	10/1/2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Impact Attenuator/Guardrail End Treatment Inspection	CODE	2551

Work Method

1. Follow appropriate safety precautions
2. Inspection must be conducted hands on, not from a vehicle.
3. Visually inspect unit per the schedule below
4. Record the type of unit, location, and any needed repairs on the inspection form.

Any needed repairs identified during inspection will need to be corrected with either in-house forces or contract. A work request for such repairs will be created for Activity 2550.

System	Hands-On Inspection Frequency	What to Look For
Guardrail End Treatments	4 Years	Cable taught, nuts tight
		Blockouts and posts not deteriorated or damaged
		Rail panels not deteriorated or damaged
		All bolts and nuts snug
		Ground under and in front of unit free of debris
		Delineation Panel present, visible, no deterioration
		Ensure extruder head is properly attached to rail
Gravel Barrels	4 Years	Barrels show no signs of cracks
		All lids locked down
		Ground under and in front of unit free of debris
Impact Attenuators	1 Year	Cables taught, not sagging
		Diaphragms and bays all straight
		All rail panels tight, not deteriorated or damaged
		Cartridges/Rip Plates not deteriorated or damaged
		Cylinders show no signs of cracks
		All bolts and nuts snug
		No misaligned parts
		Ground under and in front of unit free of debris
		Delineation Panel present, visible, no deterioration

Special Considerations

For inspecting contract new installations or repairs, the inspector shall be certified on the unit being inspected.

Minor repairs, such as tightening bolts, may be done during inspection.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	15 - 25 Units	EFFECTIVE DATE	10/1/2015

Used with Activity 2551

Impact Attenuator/Guardrail End Treatment Inspection Field Form

ROAD: _____

UNIT: _____

DATE: _____

INSPECTOR(S): _____

DIRECTION OF TRAVEL: Both (All) ☐ Inc (N/E) ☐ Dec (S/W) ☐

Page _____ of _____

GENERAL NOTES

1. All mile marker references should be entered to the nearest thousandth (0.001) of a mile by DMI.
2. Please make sure all coordinate data is collected using the WGS84 datum and in decimal degree format.
3. **Direction of Travel** is *South to North* or *West to East* **except for Divided Highways**
4. **Direction of Travel** on **Divided Highways** shall be the direction of the travel lanes being cleaned/inspected
5. Naming convention for Attenuator Assets shall be in accordance with the following:
   ATT - ***'Route Name'*** - ***'Start MP'*** - ***'Direction'*** / ***'Side of Road'*** (Sample: ATT - I 164 - 0.07 - S/R)
   Naming convention for Guardrail End Treatment shall be in accordance with the following:
   GRE- ***'Route Name'*** - ***'Start MP'*** - ***'Direction'*** / ***'Side of Road'*** (Sample: GRE- I 164 - 0.07 - S/R)

Inventory Asset Attenuator Name	Mile Marker (00.000)	X Coordinates (Longitude) (00.00000)	Y Coordinates (Latitude) (00.00000)	UNIT LOCATION	ATTENUATOR						END TREATMENT					ATTENUATOR		INVENTORY UPDATE	Deficiencies / Observations
					1 YEAR INSPECTION						4 YEAR INSPECTION								
				Left / Right / Median	G.R.E.A.T	QUADGUARD II	REACT 350	SCI 100 GM	TAU II	TRACC	Barrel Array	CAT 350	ET-PLUS	FLEAT-MT	SKT 350	Condition	Repaired	Add / Edit / Remove	
1					☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐		
2					☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐		
3					☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐		
4					☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐		
5					☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐		
6					☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐		
7					☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐		
8					☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐		
9					☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐		
10					☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐		
11					☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐		
12					☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐		
13					☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐		
14					☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐		
15					☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐		
16					☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐		
17					☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐		
18					☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐		
19					☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐		
20					☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐		

Number of Units Inspected = ☐

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	RPM Casting Inspection and Removal	CODE	2560

Purpose

To inspect RPM castings to ensure they are in good condition, maintaining reflectivity, and not loose or damaged in the pavement. Loose RPM's can create a safety hazard if they come out under traffic. This activity includes replacing any RPM's or reflectors, and the visual nighttime inspection of RPM's te evaluate their reflectivity.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule throughout the year. Roads with RPM's should be inspected annually, idealy in conjunction with another activity. RPM's inspected during performance of another activity is still reported to Activity 2560.

RPM nighttime visual inspection can be scheduled and performed throughout the year.

Reporting | **Reporting Units** RPM Miles

Accomplishment is the number of continuous miles where RPM's were inspected.

Protecting/cleaning RPM's as part of a chip seal or fog seal should NOT be reported to this activity. Report to Activity 2050 or 2051.

The attached RPM inspection report should be used to record deficiencies.

Crew Size **1-2 Workers**

	QTY
Laborer	1-2

*Traffic Control Personnel are NOT shown here

P.P.E.

Base PPE

Materials

Patching material

RPM reflectors

Job Specific Equipment

*Traffic Control Equipment is NOT shown here

Other References

Sub Activities

Average Daily Production	10 RPM Miles	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	RPM Casting Inspection and Removal	CODE	2560

Work Method

For RPM Casting Inspection:

1. Place signs and safety devices
2. Manually check all RPM castings to ensure they are tight and secure in the pavement
3. Remove loose RPM castings
4. Record missing or removed reflectors
4. Patch holes left by removed or missing castings
5. Remove signs and safety devices

Properly dispose of all removed castings.

For RPM Reflectivity Inspection:

1. Drive roads with RPM's at night in dry weather.
2. Note how far reflectors are visible. Note number of missing reflectors.
3. Note condition on attached form.

Special Considerations

APPROVED BY	
Director, Highway Maintenance	
Average Daily Production	**10 RPM Miles**
EFFECTIVE DATE	**7/1/2013**

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

RPM Inspection Report

Activity 2560

Subdistrict/Unit		RPM Inspection Report						
Contract Number	Road	From: (reference marker)	To: (reference marker)	RPM deficiency categories 1	2	3	4	Date

Legend: 1- # of castings missing 2 - # of castings removed 3 - # of lenses to be replaced 4 - # other

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Guardrail Maintenance	CODE	2580

Purpose

To restore safe driving conditions due to accident damage, vandalism, or normal deterioration of guardrail and its components. Includes repair, realignment, removal or replacement of guardrail sections, posts and hardware.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule this work throughout the year.

Damage that is hazardous to traffic should be repaired as soon as possible.

Reporting | **Reporting Units** Linear Feet

Accomplishment is linear feet of guardrail repaired. Buried ends, breakaway cable terminals, or blunt end repair are reported in linear feet to this activity.

Repair of an energy absorbing guardrail end treatments should be reported to Activity 2550.

Ensure accurate reporting of labor, materials, and equipment for Damage to State Property reimbursement.

If guardrail is being removed only, and not replaced or repaired, report the linear feet removed to Subactivity 01.

Crew Size 4 - 6 Workers

	QTY
Laborer	4-6

*Traffic Control Personnel are NOT shown here

P.P.E.

Base PPE

Materials

Guardrail Panels (INDOT Spec 910)

Guardrail Posts/Blocks (INDOT Spec 911)

Job Specific Equipment

Trailer

Post Driver

Backhoe/Loader

*Traffic Control Equipment is NOT shown here

Other References

INDOT Spec and Standard Drawings 601

Indiana Design Manual Chapter 49-4.0 and 5.0

Operating Procedure 5

Sub Activities

531 - Guardrail Removal Only

Average Daily Production	120 - 170 Linear Feet	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Guardrail Maintenance	CODE	2580

Work Method

1. Place signs and safety devices
2. Remove all debris and damaged parts
3. Reset, or replace any misaligned or damaged posts
4. Install new rail
5. Clean up work area
6. Regrade and reseed as necessary
7. Remove signs and safety devices

Special Considerations

Guardrail should typically not be removed unless a designer has reviewed the location and determined it is no longer necessary.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	120 - 170 Linear Feet	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Other Safety Device Maintenance	CODE	2590

Purpose

This activity captures work not specific to other activities relating to safety device maintenance and repair. Includes work such as barrier wall repair or other safety devices not covered under another specific activity.

Traffic control for specific activities should be reported to those activities.

Where INDOT provides only traffic control, it should be reported to 2790 or 2791.

Category Non-Road

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule and perform this work throughout the year as needed.

Reporting

Reporting Units Person Hours

Accomplishment is the total person hours worked.

This activity is NOT for reporting traffic control. Traffic control as part of another maintenance or traffic activity should be reported to that activity. INDOT provided traffic control in support of non-INDOT work should be reported to Activity 2790. INDOT provided traffic control in support of other non-maintenance or traffic INDOT work should be reported to Activity 2791.

Marking of control points or layouts for striping or special markings should be reported to those activities.

Crew Size

Workers

QTY

Determined by the specific work activity to be performed

P.P.E.

Determined by the specific work activity to be performed

Materials

Determined by the specific work activity to be performed

Job Specific Equipment

Determined by the specific work activity to be performed

Other References

Sub Activities

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2016

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Other Safety Device Maintenance	CODE	2590

Work Method

Determined by the specific work activity to be performed

Special Considerations

	APPROVED BY
	Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2016

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Emergency Maintenance	CODE	2610

Purpose

This activity is for the response to any situation to immediately restore safety or clear debris to keep roads traversible.

This activity includes the response to emergency conditions that are a result of damage caused by storms, flooding, slides and fallen rocks, pavement settlements, large objects on the road, damage to structures and safety devices such as guardrail and signs, as well as isolated surface defects.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

This activity is the response to damage that is caused from accidents, storms, or any unexpected mishap that can happen at any time throughout the year.

Reporting | **Reporting Units** Person Hours

Accomplishment is the number of person hours required to restore temporary safe driving conditions or to place the necessary temporary warning devices.

This activity is only for recording the initial response-type work only. Permanent repairs should be recorded to the specificy work activity.

Traffic control for accidents should be charged to Activity 2790 Other Traffic Control Maintenance.

This activity may be used to report initial clearing/plowing of debris from the roadway to keep the road open. Actual removal of debris from the R/W should be reported to Activity 2611, Storm Debris Removal.

Note:Overtime callout for routine maintenance activities such as patching, sign repair, or drainage maintenance should be charged to the repair activity if permanent repairs are made.

Crew Size | **Workers**

QTY

Determined by specific work activity to be performed.

Report actual labor usage for damage to state property claims recovery.

P.P.E.

Base PPE

Materials

Determined by specific work activity to be performed.

Report actual materials usage for damage to state property claims recovery.

Job Specific Equipment

Determined by specific work activity to be performed.

Report actual equipment used for damage to state propertyclaims recovery.

Other References

Sub Activities

722 Damage to an INDOT Structure	723 Isolated Surface Defects	724 Roadway Debris Clearing
725 Other Emergency Maintenance	726 Settlements	727 Slides and Fallen Rocks
728 Washouts and High Water		

Average Daily Production	Person Hours	EFFECTIVE DATE	July 1, 2016

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Emergency Maintenance	CODE	2610

Work Method

Respond and restore safe driving conditions for emergencies caused by:

Subactivity 722 - Damage to an INDOT Structure

1. Investigate and report all damage of INDOT's assets for claims recovery.
2. Place temporary warning devices to warn motorists such as stop barrels, traffic barrels and signage.
3. If a structure is not passable and a closure is necessary then follow the temporary road closure policy.

Subactivity 723 - Isolated Surface Defects

1. Investigate the cause of the surface defect.
2. Temporary signs can be placed or holes patched with an aggregate containing lime.

Subactivity 724 - Roadway Debris Removal

1. INDOT may use state equipment to move objects to the shoulder of the road to expedite safe driving conditions

Subactivity 725 - Other Emergency Maintenance

1. Investigate and place temporary devices or perform temporary repairs not specified above.

Subactivity 726 - Settlement

1. Investigate the cause of the settlement.
2. Place warning signs.
3. Aggregate with lime may be used as a temporary means to level the roadway.
4. If the road is not passable and a closure is necessary then follow the temporary road closure policy.

Subactivity 727 - Slides and Fallen Rocks

1. Remove debris from roadway and examine the roadside for stability to determine if further action is needed.
2. If a road is not passable and a closure is necessary then follow the temporary road closure policy.

Subactivity 728 - Washouts and High Water

1. For minor flash flooding place high water signs to warn motorist to prevent hydroplaning.
2. For roads that are not passable and a closure is necessary then follow the temporary road closure policy.

NOTE: FEMA reporting: All Natural Disasters should be reported to the appropriate work activity; not 2610. This activity is for initial response (within 48 hours) only to keep roads passable.

Special Considerations

This activity is designed for only temporary repairs or action. If permanent repairs are made they should be charged to the appropriate activity.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	July 1, 2016

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Storm Debris Removal	CODE	2611

Purpose

This activity is the actual removal from the right of way of debris created from a storm or other disaster. This includes bagging, chipping, loading and hauling debris off site.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

This activity is the response to damage that is caused from storms or any unexpected disaster that can happen at any time throughout the year.

Reporting | **Reporting Units** Cubic Yards

Accomplishment is the number of cubic yards of debris removed from the right of way.

Clearing lanes only by plowing pushing debris to the shoulder reported to Activity 2610, Emergency Maintenance.

For FEMA reimbursement, correct documentation is essential. Report the type of debris being removed to the correct subactivity. If large quantities of debris is mixed type (some woody, some building, some silt), create a new, separate work order when one type exceeds 13 cubic yards (approximately 1 tandem load).

Crew Size 3 Workers

	QTY
Laborer	3

*Traffic Control Personnel are NOT shown here

P.P.E.

Base PPE

Materials

Trash Bags

Job Specific Equipment

Front End Loader
Skid Steer Loader
Chipper
Chain Saw
*Traffic Control Equipment is NOT shown here

Other References

Sub Activities

3001 – Trees and Woody Debris
3002 – Sand, Mud, Silt and Gravel
3003 – Building Components and Contents

Average Daily Production	100 Cubic Yards	EFFECTIVE DATE	October 1, 2015

ACTIVITY	Storm Debris Removal	CODE	2611

Work Method

Subactivity 3001 – Trees and Woody Debris

See Activity 2220 for details on proper procedures for chainsaws and brush chippers.

1. Saw debris into manageable pieces
2. Smaller debris (such as limbs) may be chipped
3. Load and haul to an approved disposal site

Subactivity 3002 – Sand, Mud, Silt and Gravel

1. Excavate debris with loader or other equipment
2. Load and haul to an approved disposal site

Subactivity 3003 – Building Components and Contents

1. Saw or break debris into manageable pieces
2. Bag or load directly into trucks
3. Load and haul to an approved disposal site

Special Considerations

Estimated volumes. Note that "vehicle capacities" is only the volume to the level of the bed. Material stacked above this would be additional.

Vehicle Capacities (to top of bed)	Est. CYS
Pickup Bed	1.3
Crew Cab Bed	2.4
Tandem Axle Bed	13.2
Single Axle Bed	4.1
Trash Bag - 30 Gallon	0.5

APPROVED BY

Director, Highway Maintenance

Average Daily Production	100 Cubic Yards	EFFECTIVE DATE	October 1, 2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Snow and Ice Removal	CODE	2630

Purpose

To remove snow and ice from the roadway during and after a storm. Includes loading operations of snow required to support snow and ice removal operations, removal of ice caused by flooding, water leaks or other sources of water on the roadway that can become frozen.

This activity includes the application of brine and or other approved de-icers prior to the forecast of inclement weather and/or icing from frost.

This activity includes the use of a designated loader operator for loading trucks.

Category Roadway/Drainage

- ☐ PM
- ☐ QA
- ☒ Unit Cost
- ☐ Plan Location

Scheduling & Coordination

Work is performed and scheduled typically between October and April. The scheduling of any snow and ice strategy will require the use of sound judgment, interpretation of available weather data, and prompt action. If an event is expected to have a duration that exceeds 12 hours then the scheduling of shift work for drivers and staff is recommended.

Reporting | **Reporting Units** Miles

Report Work to the appropriate sub activity.

Reporting units are miles serviced. Loading only is reported with 0 accomplishment.

For this activity, comments on the work order are only required if special or unusual circumstances are encountered.

Note: For the removal of ice and debris that are frozen on curb drains, inlets, and bridge drains use Activity 2690 Other Winter Maintenance.

Crew Size 1- 2 Workers

QTY

Determined by specific work activity to be performed.

P.P.E.

Base PPE

Materials

Sodium Chloride (granular)

Sodium Chloride (liquid brine)

Calcium Chloride (liquid)

Calcium Chloride bag pellets or flakes (granular)

Magnesium Chloride (liquid)

Agricultural Based Chlorides (liquid)

Job Specific Equipment

Semi Tractor - Trailer Sprayer

Tandem Snow Plow Truck

Single Axle Snow Plow Truck

Crew Cab Ton Snow Plow Truck

Spreader (Do not show a spreader for a Do-All truck)

Tank/Applicator

Snow Plow

Front End Loader

Tow Plow

Other References

OM 08-01 Snow and Ice Policy and the Snow and Ice Control Operating Memorandums

Sub Activities

41- Anti-icing

42- Plowing & Spreading Chemicals

43 - Designated Loader Operator

Average Daily Production	142.5 Miles	EFFECTIVE DATE	1/1/2015

ACTIVITY	Snow and Ice Removal	CODE	2630

Work Method

Sub Activity 41 - Anti-Icing:

1. To anti-ice you will select the available equipment needed to apply liquid deicers.
2. Load the tank with salt brine. A product used to enhance the brine may also be used as a blend.
3. Specific loading instructions for available materials are required.
4. Chemicals are applied at a rate of 20 to 80 gallons per lane mile at normal posted driving speeds.
5. Specific application rates for forecasted conditions are required as to spot treat or to treat all lanes.

Sub Activity 42 - Plowing & Spreading:

Deicing Work Method

1. To de-ice you will select the available equipment needed to apply liquid or solid deicers.
2. Load the tank, pre-wet tank and or spreader bed with the desired product available.
3. Only one truck is allowed in the loading/unloading area at any one time.
4. No one is permitted in the staging area.
5. Drivers not loading/unloading their own trucks must stay inside the cab until they are no longer in the staging area.
6. Trucks and loaders are to be kept on a level surface.
7. Do not overlaod trucks.
8. Distribute the loads evenly.
9. Avoid movements that result in striking the truck and or spreader with the loader bucket.
10. Do not get out of the loader with the loader bucket in an elevated position.
11. Never leave a vehicle running unattended.
12. Keep the loader bucket as low as possible at all times.
13. Avoid and cleanup spillage regulary.
14. Specific product instructions are required. Material selection is based on the goal of the intended application,current road conditions, temperatures, and forecasts.
15. Application rates will range from 25 lbs to 400 lbs per lane miles for granular products and 20 gallons to 150 gallons per lane mile for liquid products. Specific application instructions are required.

Plowing Work Method

1. Plowing is intended to remove as much snow and loose ice as possible before applying chemicals.
2. Plowing is the the only method that is needed if the pavement is both and cold and dry and the snow is not adhering to the pavement. Specific plowing instructions are required.

Snow Hauling Work Method

1. This is the process of using mechanical equipment to load snow onto trucks to be hauled to a stockpile area to melt. This is done when additional space is required to plow new forecasted snowfall and to prevent refreeze from melted stockpiled snow.
2. Load snow onto trucks.
3. Do not overload.
4. Distribute load evenly.
5. Dump snow at designated site.
6. Only one truck allowed to unload at a time.

ACTIVITY	Snow and Ice Removal (Continued)	CODE	2630

Sub Activity 43 - Designated Loader Operators

Loader Operations Work Method

1. Loader operators will only allow one truck in the staging area at a time.
2. Drivers are required to stay in the vehicle and not allowed on foot in the staging area.
3. Loaders are to be kept on a level surface.
4. Do not overload trucks.
5. Distribute the loads evenly.
6. Avoid movements that involve striking the truck or spreader with the loader bucket.
7. Do not get out of the loader with the bucket in an elevated position.
8. Do not leave the loader running unattended.
9. Keep the loader bucket as low as possible at all times.
10. Avoid and cleanup spillage regularly.

ACTIVITY	Snow and Ice Removal	CODE	2630

Special Considerations

This activity should be performed in an effort to maintain or return roadways to a safe driving condition. This is achieved by snow & ice strategies such as anti-icing, de-icing, plowing,spreading, or spraying. The appropriate timing of any strategy will require the use of sound judgement, interpretation of available weather data, and prompt action. Anti-icing is the process to prevent bonding of snow and ice to the pavement by placing chemical prior to the storm or frost condition. De-icing is the process of breaking the bond of snow and ice from the pavement after it has formed. Plowing is the process of removing as much snow or loose ice prior to applying chemicals in anti-icing and de-icing operations or to remove a dry snow that is not adhering to the pavement. Spreading is the mechanical process of applying dry or pre-wet deicing chemicals to the roadway to melt or break the bond. Spraying is the mechanical process of applying liquid deicers to the roadway to melt or break the bond.

Designated loader operator is the manpower assigned to operate the loader for the purpose of mixing and loading materials.

		APPROVED BY	
		Director, Highway Maintenance	
Average Daily Production	**142.5 Miles**	**EFFECTIVE DATE**	**1/1/2015**

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Brine Mixing	CODE	2640

Purpose

The creation of brine to be used in anti-icing and de-icing operations, prior to and during storm events to prevent snow/ice from bonding to the pavement.

Category Non-Road

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

Scheduling & Coordination

This activity is typically scheduled between October and April to maintain an adequate supply of brine. A review of weather forecast is required to determine material needs to schedule within a normal working hours shift.

Reporting

Reporting Units Gallons

Accomplishment is the number of gallons that are produced and stored.

Crew Size 1- 2 Workers

	QTY
Laborer	1-2

P.P.E.

Base PPE

Materials

Sodium Chloride - Salt

Job Specific Equipment

Loader
Brine Maker
Hydrometer

Other References

OM 08-01 Snow and Ice Policy and the Snow and Ice Control Operating Memorandums

Sub Activities

Average Daily Production	4,000 – 8,000 gallons	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Brine Mixing	CODE	2640

Work Method

INDOT has a variety of brine makers from in-house home-made to state of the art computer controlled models. Regardless of the type they all require that salt be added to a hopper and then filled with water to dissolve the salt into a liquid solution known as brine. The solution is then monitored to ensure that it has reached the desired concentration. A Hydrometer is a tool that is used to measure the concentration percentage of salt ions in the water. The correct specific gravity for the brine solution is 23.3 percent. Manual machines will require the use of a Hydrometer. The newer computer automated systems have this ability built into the brine maker. Once the soulution is at the desired concentration it is then pumped into storage tanks for operational use.

1. Load salt into your brine maker hopper.
2. Fill your hopper with water to dissolve the salt into a brine solution.
3. Test your dissolved brine soulution with a hydrometer unless your system is automated and has this feature built in.
4. The brine solution level is to read a specific gravity of 23.3 percent.
5. The brine is then pumped into storage holding tanks.

Special Considerations

Perform this activity prior to the winter months and throughout the winter as needed, to maintain an adequate supply of brine.

Review weather to determine material need and try to schedule within a normal working hours shift.

Salt needs to be clean.

Periodic flushing and cleaning of the brine maker is required.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	4,000 – 8,000 gallons	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Stockpiling Winter Materials	CODE	2650

Purpose

This Activity is used for the stockpiling and transferring of winter abrasives, de-icing chemicals, and anti-icing chemicals that are used in the performance before and during the winter season. This includes the transfer of salt brine to unit and storage tank locations that do not have brine makers. This activity also includes the hauling and transferring of granular winter materials to unit and storage locations.

Category Non-Road

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

Scheduling & Coordination

Perform this activity prior to the winter months and throughout the winter as needed to maintain an adequate supply of winter materials.

Reporting | **Reporting Units** Person Hours

Accomplishment is the number of person hours and equipment used that is required to safely stockpile winter materials under roof in accordance with INDOT policy and procedures.

Note: Material stockpiled is not reported as an accomplishment.

If a winter abrasive stockpile is treated with a deicer to freeze-proof that stockpile. Only the de-icier material that is used to freeze proof is recorded as an accomplishment. Not the entire winter abrasive stockpiled material.

Crew Size | **Workers**

QTY

Determined by specific work activity to be performed.

P.P.E.

Base PPE

Materials

*Sodium Chloride (only used when freeze-proofing winter abrasives)

Job Specific Equipment

Loader
Dump Truck
Forklift
Conveyor

Other References

OM 08-01 Snow and Ice Policy and the Snow and Ice Control Operating Memorandums

Sub Activities

Average Daily Production	Person hours	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Stockpiling Winter Materials	CODE	2650

Work Method

INDOT's practice and policy is to keep all deicing materials and mixes under roof and on a impermeable surface.

Material is to be handled as little as possible in an effort to decrease or eliminate spillage, material degradation, and unwanted moisture.

A. Stockpiling/Transferring:

1. Only one truck is allowed in the loading/unloading area at any one time.
2. No one is permitted in the staging area.
3. Drivers not loading/unloading their own trucks must stay inside the cab until they are no longer in the staging area.
4. Trucks and loaders are to be kept on a level surface.
5. Do not overload trucks.
6. Distribute the loads evenly.
7. Avoid movements that result in striking the truck and or spreader with the loader bucket.
8. Do not get out of the loader with the loader bucket in an elevated position.
9. Never leave a vehicle running unattended.
10. Keep the loader bucket as low as possible at all times.
11. Avoid and cleanup spillage regularly.

B. Deliveries:

Delivered materials require that the load is visually inspected for contamination before and after dumping.

Material tickets must visually be inspected to ensure proper delivery location and material type.

No liquid material may be placed in a tank that is not properly marked and identified. Not all liquids are compatible.

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person hour	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Patrolling	CODE	2660

Purpose

A patrol is necessary when adverse conditions develop that could cause unsafe conditions on roadway surfaces. Patrol roads to determine the development of hazardous conditions that could require the attention of maintenance forces that are a result of storms such as icing, debris, downed trees and limbs, and flooding.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule is year around as required. Try to schedule work so that overtime work is not required. Technologies that are available such as MDSS and Scan Web for RWIS can reduce the time that is needed for patrol by monitoring the bridge deck and pavement temperatures and looking at the storms movement from radar images.

Reporting

Reporting Units Miles

Accomplishment is the number of miles patrolled.

Crew Size **1- 2 Workers**

	QTY
Driver/Laborer	1-2

P.P.E.

Base PPE

Materials

Sodium Chloride (granular)
Sodium Chloride (liquid brine)
Calcium Chloride (liquid)
Calcium Chloride bag pellets or flakes (granular)
Magnesium Chloride (liquid)
Agricultural Based Chlorides (liquid)

Job Specific Equipment

Pickup
Crewcab
Dump Truck
Spreader
Plow

Other References

Sub Activities

Average Daily Production	200 miles	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Patrolling	CODE	2660

Work Method

1. Patrol when a storm has been forecasted that has the potential for hazardous conditions to develop affecting the safe conditions on the roadway surface.
2. Communicate that a patrol has been deployed to the appropriate personnel.
3. Use technologies to determine the patrol parameters and the appropriate timing for the patrol.
4. Spot treatment or action by the patrol should be done if it can be done safely.

Special Considerations

Technologies that are availabe should be utilized such as the Weather Service, radar, forcecast, and pavement forecast in conjunction with Scan Web for the RWIS network to reduce the time that is needed for patrol.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	200 miles	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Natural Snow Fence	CODE	2670

Purpose

To plant by seeds or plants, native vegetation, and trees to reduce the effects of blowing or drifting snow. These plantings may be completed by seed, plant plugs, tree seedling, potted, or balled & burlap trees.

Category Right-of-Way

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☒ Plan Location

Scheduling & Coordination

Schedule work when ground conditions have adequate moisture in the Spring.

Reporting

Reporting Units Acres

Accomplisment is the total acres of natural snow fence that is planted.

Crew Size 1- 4 Workers

	QTY
Crew Leader	1
Truck Driver/Laborer	2
Tractor/Loader Operator	1

P.P.E.

Base PPE

Materials

Warm-season grass /Forbs seed
Tree Seedlings or Plant plugs
Trees, Balled& Burlap or Potted
Steel fence post
“Do not Mow or Spray” signs

Job Specific Equipment

Tractor	1
No-till drill	1
Tree seedling Planter	1
Plug/ seedling hollow dibble	3-5
Post driver	1

Other References

Sub Activities

Average Daily Production	4 to 8 Acres	EFFECTIVE DATE	July 1, 2013

ACTIVITY	Natural Snow Fence	CODE	2670

Work Method

1. Insert dibble blade 1-2" deeper than the length of the seedling's roots at angle shown and push straight up.
2. Remove dibble and place seedling at correct depth (same as or ½"deeper than at nursery). Make sure there is no dry grass sticking in the hole with the tree that could act like a wick and dry out the soil around the tree.
3. Insert the dibble 2 inches toward you from seedling and pull the handle toward you, firming the soil at the bottom of the roots. This is to prevent an air pocket at the bottom of that will dry out the roots and kill the tree
4. Push the handle away from you, firming soil at top of roots.
5. Repeat steps 3 and 4 about 2 inches on the other side of the tree to firm the soil evenly.
6. Fill in the hole by stamping with heel. Heel in all around the tree to make sure there are no air pockets.

Establishing Native Warm-Season Grasses (NWSG)

1. NWSG grow during the summer months, thus are usually planted in late spring or early summer. Dormant plantings may be made after Dec. 1, if the soil has thoroughly cooled. Increase the seeding rate 25 to 50 percent for dormant seeding to compensate for seed that will be eaten by rodents or rot before spring.
2. NWSG may be planted into clean-tilled seedbeds or killed sods. Clean-tilled seedbeds should be fine textured and firm, preferably rolled. Several methods work well.
3. NWSG may be planted on killed cool-season grass sods using a rangeland or no-till drill capable of handling chaffy or de-bearded seed.
4. Seed depth should be no more than 1/4 inch to 1/2 inch for all NWSG. Weeds, especially grassy weeds such as giant foxtail, should not be allowed to grow more than 18 inches tall before mowing.
5. Mow to a height of 6 to 8 inches the first season. Cease mowing after early August to avoid disrupting root carbohydrate storage of the native grasses.

Special Considerations

The area should be free of noxious weeds prior to seeding or planting. Adjacent property owners shall be contacted prior to work to explain purpose of planting. Type of material to be planted will affect crew size and equipment.

Common Mistakes That Will Kill Seedling/Plant Plugs

1. Storing seedlings/plants in a bucket of water for more than 1-2 hours.
2. Planting too deep or too shallow.
3. Allowing roots to curl back toward the top of the hole.
4. Not allowing proper root spread.
5. Planting in sod without good site preparation.
6. Leaving in boxes exposed to the sun.
7. Planting in dry soil.
8. Planting a species not adaptable to the site.
9. Keeping trees in boxes more than a few days without cold storage.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	4 to 8 Acres	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Man-made Snow Fence	CODE	2680

Purpose

This activity is used when erecting snow fence on INDOT Right of Way or attaching snow fence to existing INDOT owned farm fence as a permanent fence to reduce blowing and drifting snow.

This activity is also used when placing and removing temporary snow fence on privately owned land.

Category Right-of-Way

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☒ Plan Location

Scheduling & Coordination

If on private land schedule work after the crops are out and when ground conditions will not rut or compact soils. Remove before soil conditions are ready to plant and ground will support equipment without rutting. Keep in contact with the property owner during the season to maintain a positive relationship and to resolve/correct any problems that may develop.

Schedule work on INDOT's Right of Way prior to winter when soil conditions will not damage turf.

Reporting | **Reporting Units** Linear Feet

Accomplishment is the number of linear feet of snow fence that is erected or removed.

Crew Size 1- 2 Workers

	QTY
Laborers	1-2

Job Specific Equipment

Crew Cab or Dump Truck	1
Tractor /Loader	1
Post driver	1

P.P.E.

Base PPE

Materials

Snow Fence
Plastic Tie Straps
Steel fence post
Salvaged Fencing

Other References

Sub Activities

200 - Fence Removal Only

Average Daily Production	300 - 600 Linear Feet	EFFECTIVE DATE	July 1, 2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Man-made Snow Fence	CODE	2680

Work Method

1. Obtain Right of Entry Agreement before placing on Private Property.
2. Place post at 8 foot intervals a minimum of 24 inches deep along snow fence line
3. Secure Snow fence a minimum of every 6 inches along the length of each post.
4. Do not leave gaps under fence or between sections.
5. When using 48 inch high snow fence, it should be placed 25 to 40 feet from the edge of pavement.

NOTE: Have underground utilities marked prior to placing post in ground.

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	300 - 600 Linear Feet	EFFECTIVE DATE	July 1, 2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Other Winter Maintenance	CODE	2690

Purpose

To install snow plows and spreader beds on trucks for winter operations. .

To calibrate equipment for winter operations, and other winter maintenance not specified.

Category Non-Road

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

This activity is scheduled when inclement weather forecasts are given typically October 15th thru April 1st.

This activity is scheduled to calibrate and recalibrate spreader and application equipment prior to winter operations in the fall and during the winter season as needed.

Reporting | **Reporting Units** Person Hours

Accomplishment is in person hours determined by specific work activity to be performed.

Note: Hauling or stockpiling any winter materials including the transfer of brine is reported on Activity 2650 Stockpiling Winter Materials.

All cleaning, checking fluids, repairs, adjustments, painting of equipment including Spring and Fall Assessments should be reported on Activity 2810 Equipment Servicing.

All snow fence maintenance should be reported on Activity 2670 Man-made Snow Fence.

The transfer of equipment to the shop or from one unit to another should be reported on Activity 2890 Other Support Activities.

All cleanup around the salt buildings and unit grounds should be reported to Activity 2830 Building & Grounds Maintenance.

Clearing snow and ice from drains is reported to Activity 2350, Manual Drain Cleaning.

Crew Size | **Workers**

QTY

Determined by specific work activity to be performed.
Specific assignment instructions are required.

P.P.E.

Base PPE

Materials

Determined by specific work activity to be performed.
Job specific instructions are required for any materials used on this activity.

Job Specific Equipment

Determined by specific work activity to be performed.
Specific assignment instructions are required for equipment.

Other References

OM 08-01 Snow and Ice Policy and the Snow and Ice Control Operating Memorandums

Sub Activities

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2015

ACTIVITY	Other Winter Maintenance	CODE	2690

Work Method

A. Winter Operations:

1. Attach plows and spreaders on the trucks.

2. Check to ensure that the safety pins and straps are locked securely holding the plow and spreader in place.

3. All hydraulic hoses are to be attached and then operated to check for leaks and to ensure equipment is properly performing.

B. Calibrating Equipment: Equipment shall be calibrated each year and any time during the season if the hydraulic pump or control box has been changed equipment should be re-calibrated to ensure the proper amount of material is being dispersed.

1. Warm truck's hydraulic oil to normal operating temperature with spreader system running.

2. Put partial load of salt on truck.

3. Mark shaft end of auger or conveyor.

4. Dump salt on auger or conveyor.

5. Rev the truck engine to operating RPM (at least 2000 RPM).

6. Count number of shaft revolutions per minute at each spreader control setting, and record.

7. Collect salt for one revolution and weigh, deducting weight of container. (For greater accuracy, collect salt for several revolutions and divide by this number of turns to get the weight for one revolution.)

When to recalibrate

- When the spreader/controller unit is first put into service.
- Annually, before snow and ice control operations begin.
- After major maintenance of the spreader truck is performed and/or after truck hydraulic fluid and filters are replaced.
- After the controller unit is repaired or when the speed (truck or belt/auger) sensors are replaced.
- After new snow and ice control material is delivered to the maintenance garage.

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	4/1/2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Lift Bridge Attendant	CODE	2710

Purpose

This activity is the full time operation of lift bridges.

This activity only includes operation of the lift bridge. Report specific maintenance work to the appropriate activity.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule and perform work at each lift bridge to ensure required coverage.

Reporting

Reporting Units Person Hours

Accomplishment is the total person hours worked.

Crew Size 1 Workers

	QTY
Lift Bridge Attendant	1

P.P.E.

1. Base PPE

Materials

Job Specific Equipment

Other References

Sub Activities

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Lift Bridge Attendant	CODE	2710

Work Method

1. Barge captain notifies attendant of approach
2. Attendand notifies adjacent lift bridges to ensure alternate routes are not simultaneously blocked
3. Attendant notifies 911 center bridge will be lifted
4. Attendant activates road barricades and safety devices, ensuring all are operational
5. Attendant lifts bridge, ensuring barge is safely through before lowering
6. Attendant lowers bridge and deactivates barricades and safety devices

Special Considerations

Operator should have access to a 2 way marine radio in order to communicate with the Coast Guard, barge operators, and other lift bridges.

		APPROVED BY	
		Director, Highway Maintenance	
Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Rest Park and Weigh Station Maintenance	CODE	2720

Purpose

General housekeeping, mowing and minor maintenance of state maintained rest areas, roadside parks and weigh stations performed by INDOT forces.

This activity does not include work at DNR facilities or other state institutions.

Category Roadway/Drainage

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

Scheduling & Coordination

Schedule and perform this activity as required to maintain each facility in a clean and neat condition.

Reporting — **Reporting Units** Person Hours

Accomplishment is total person hours worked.

This activity only includes minor maintenance typically taking less than 1 hour, and general housekeeping. Report any pavement, shoulder, sweeping, or tree trimming activities to the specific activity being performed. Any major improvements, repairs or modifications should be conducted under the supervision of the Facilities Manager and reported to the appropriate facility management activity. When loaned out to the Facilities Manager, report time to Activity 1010.

Maintenance of other INDOT facilities, such as Units or Subdistricts, is reported to Activity 2830.

Maintenance of DNR facilities or other state institutions should be reported to the activity for the specific work being performed.

Crew Size — **Workers**

QTY

Determined by the specific work to be performed

P.P.E.

Determined by the specific work to be performed

Materials

Determined by the specific work to be performed

Job Specific Equipment

Determined by the specific work to be performed

Other References

Sub Activities

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE
WORK PERFORMANCE STANDARD

ACTIVITY	Rest Park and Weigh Station Maintenance	CODE	2720

Work Method

Activities may include:

1. Lawn care
2. Minor repairs to tables and other facilities
3. Litter barrel service
4. Clean out scale pits at weigh stations
5. Minor plumbing or electrical repairs
6. Mowing grounds
7. Minor sewage/water treatment plant maintnenance
8. Minor Sidewalk or curb work

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Full Width Litter Pickup	CODE	2750

Purpose

To remove litter along continuous sections of highway for the entire right of way width by walking. This activity includes pickup, bagging, loading, hauling and disposing of removed litter.

Category Right-of-Way

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule and perform work prior to the start of the first mowing cycle, for special occasions, such as Trash Bash, or as needed throughout the year.

Reporting

Reporting Units Cubic Yards

Accomplishment is the total cubic yards of litter removed. See the "Special Considerations" section for estimated volumes of common items.

Isolated areas of litter or debris removal should be reported to Activity 2760.

Full width litter removal performed by DOC crews under INDOT supervision should be reported to subactivity 01.

Materials should be reported to the Cost portion of the Cost and Accomplishment tab; under the drop down for M-Materials. Small and large animals, trash bags, and cubic yards of debris are reported to the cost day card.

Crew Size 2-3 Workers

	QTY
Laborer	2-3

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Crew Cab

*Traffic Control Equipment is NOT shown here

P.P.E.

Base PPE

Materials

Trash Bags

Other References

Sub Activities

956 - DOC Litter Removal

Average Daily Production	6-13 Cubic Yards	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Full Width Litter Pickup	CODE	2750

Work Method

1. Place required safety devices
2. Crews should only pick up litter in one direction of travel at a time
3. The entire right of way width is walked and all litter greater than the size of a fist is picked up
4. Use leap frog method when possible
   a. First man starts litter pickup and bagging at beginning of assigned area
   b. Second man drives ahead approximately 500 feet, leaves the truck and starts litter pick up
   c. When the first man reaches the truck, he empties his litter into truck, drives ahead another 500 feet, leaves the truck and begins litter pick up
   d. This operation continues until end of the day or until assigned area is covered
5. Remove safety devices
6. Dispose of litter at designated dumping areas

Special Considerations

Estimated volumes. Note that "vehicle capacities" is only the volume to the level of the bed. Material stacked above this would be additional. Note that additional crew members may be required depending on right of way width.

Large Items	Est. CYS
Fridge	1.4
Twin Mattress	0.7
Queen Mattress	1.1
King Mattress	1.4
Couch	1.4
Full Semi Tire	0.7
Trash Bag - 30 Gallon	0.5
Vehicle Capacities (to top of bed)	**Est. CYS**
Pickup Bed	1.3
Crew Cab Bed	2.4
Tandem Axle Bed	13.2
Single Axle Bed	4.1

APPROVED BY

Director, Highway Maintenance

Average Daily Production	6-13 Cubic Yards	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Spot Litter Pickup	CODE	2760

Purpose

Remove litter and debris from isolated sections of the right of way, roadway, or shoulder. This activity includes pickup, bagging, loading, hauling and disposing of removed litter.

Category Right-of-Way

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule and perform work prior as needed throughout the year.

Reporting | **Reporting Units** Cubic Yards

Accomplishment is the total cubic yards of litter removed. See the "Special Considerations" section for estimated volumes of common items.

Debris or dead animals removed while performing another activity should report such work to that activity.

Picking up trash bags from an Adopt A Highway cleaning event should be reported as Subactivity 240.

Clearing storm debris from the right of way should be reported to Activity 2611, Storm Debris Removal.

Materials should be reported to the Cost portion of the Cost and Accomplishment tab; under the drop down for M-Materials. Small and large animals, trash bags, and cubic yards of debris are reported to the cost day card.

Crew Size 2 Workers

	QTY
Laborer	2

*Traffic Control Personnel are NOT shown here

P.P.E.

Base PPE

Materials

Trash Bags

Job Specific Equipment

Crew Cab

*Traffic Control Equipment is NOT shown here

Other References

Sub Activities

240 - Adopt A Highway bag pickup

Average Daily Production	6-8 Cubic Yards	EFFECTIVE DATE	10/1/2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Spot Litter Pickup	CODE	2760

Work Method

1. Pull vehicle off of the roadway
2. Collect litter or debris, taking care when loading large or heavy items
3. Dispose of litter at designated dumping areas

Special Considerations

Estimated volumes. Note that "vehicle capacities" is only the volume to the level of the bed. Material stacked above this would be additional. Note that additional crew members may be required depending on right of way width.

Large Items	Est. CYS
Fridge	1.4
Twin Mattress	0.7
Queen Mattress	1.1
King Mattress	1.4
Couch	1.4
Full Semi Tire	0.7
Trash Bag - 30 Gallon	0.5
Vehicle Capacities (to top of bed)	**Est. CYS**
Pickup Bed	1.3
Crew Cab Bed	2.4
Tandem Axle Bed	13.2
Single Axle Bed	4.1

APPROVED BY

Director, Highway Maintenance

Average Daily Production	6-8 Cubic Yards	EFFECTIVE DATE	10/1/2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Roadway Sweeping	CODE	2770

Purpose

To remove excess loose sand, chemicals, and debris from roadway, intersections, curbs, and gutters perform mechanical or manual continuous sweeping.

Category Roadway/Drainage

- ☐ PM
- ☐ QA
- ☒ Unit Cost
- ☐ Plan Location

Scheduling & Coordination

Schedule sweeping of curb and gutter sections throughout the year as required. Special effort should be directed to spring cleanup of accumulated sand and chemicals, from winter snow and ice control operations.

Reporting

Reporting Units Linear Miles

Accomplishment is continuous linear miles swept, whether by mechanical or manual means

Cleaning bridges should be reported to 2410, Cleaning Bridge Decks. Litter, trash bag, or other debris removal should be reported to 2760, Spot Litter Pickup.

Report manual hand sweeping to Subactivity 49. Accomplishment is still in continuous linear miles swept.

Crew Size 2 Workers

	QTY
Sweeper Truck Operator	1
Laborer	1

*Traffic Control Personnel are NOT shown here

P.P.E.

Base PPE

Materials

Job Specific Equipment

Sweeper Truck

Other References

*Traffic Control Equipment is NOT shown here

Sub Activities

49 - Hand Sweeping

Average Daily Production	10 Linear Miles	EFFECTIVE DATE	7/1/2013

ACTIVITY	Roadway Sweeping	CODE	2770

Work Method

Mechanical Sweeping

1. Set up appropriate traffic control
2. Sweep lanes, ensuring adjacent curb and gutters are cleaned
3. Sweepers should dump sweepings at designated locations

Manual Hand Sweeping

1. Place signs and safety devices
2. Break loose material as required
3. Sweep material
4. Load material into dump trucks
5. Dump at designated locations
6. Remove signs and safety devices

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	10 Linear Miles	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Other Service Activities	CODE	2790

Purpose

Report other service type activities that are not specifically identified as separate activities. This activity includes providing traffic control for non-INDOT work.

Category Non-Road

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

Scheduling & Coordination

Schedule and perform this work throughout the year as required.

Reporting — **Reporting Units** Person Hours

Accomplishment is total person hours.

See the Work Method for example work to report ot this activity.

Providing traffic control for other INDOT activities, such as core drilling, FWD, bridge inspection, or QA's, should be reported to activity 2791.

DOC litter removal should be reported to Activity 2750.

Work in DNR or other state facilicites should be reported to the work activity being performed.

Crew Size — **Workers**

QTY

Determined by specific work activity to be performed.

P.P.E.

Determined by specific work activity to be performed.

Materials

Determined by specific work activity to be performed.

Job Specific Equipment

Determined by specific work activity to be performed.

Other References

Sub Activities

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Other Service Activities	CODE	2790

Work Method

Work reported to this activity may include:

1. Assisting law enforcement
2. Providing traffic control for accidents
3. Providing traffic control for any non-INDOT work
4. Performing non-traffic control work for other INDOT divisions
5. Performing work for other governmental agencies

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Traffic Control Support	CODE	2791

Purpose

To provide traffic control support to non-maintenance INDOT activities. Such activities may include core drilling, FWD, geotech, QA testing, and evaluations of new products.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule and perform this work throughout the year as required.

Reporting | **Reporting Units** Person Hours

Accomplishment is total person hours.

Providing traffic control for non-INDOT activities, such as accidents or law enforcement, should be reported to activity 2790.

Traffic control as part of another maintenance or traffic activity should be reported to that activity.

Crew Size 3 Workers

	QTY
Laborer	3

P.P.E.

Base PPE

Materials

Job Specific Equipment

Arrow Board	1-2
Attenuator	1-2
Dump Truck	1-2
Crew Cab	1

Other References

INDOT Workzone Traffic Control Guidelines

Sub Activities

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Traffic Control Support	CODE	2791

Work Method

1. Place signs and safety devices
2. Close lane to traffic
3. Activities take place
4. Open lane to traffic once activities are finished
5. Remove signs and other safety devices

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Equipment Servicing	CODE	2810

Purpose

The routine service, cleaning, brush painting and maintenance of INDOT's equipment fleet.

This activity includes equipment inspections and any work done in preparation for them, including attaching plows and spreaders.

Category Non-Road

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule and perform this work throughout the year as necessary.

Reporting | **Reporting Units** Person Hours

Accomplishment is the total person hours worked.

Only report the specific equipment being serviced for the hours it is actually being operated. If equipment is serviced in the yard and not driven anywhere, do not report it. If equipment is being transported to another facility or vendor for repair, report to Activity 2890.

See the work method for examples of work that fall under this activity. Report specific work to the appropriate subactivity. Report any work done preparing equipment for and participation in snow and ice inspections to Subactivity 175.

Work performed under this activity should only include minor repairs and cleaning of equipment. More intensive work, including any PM or Work Order repairs or those involving replacement of non-routine parts, including parts chasing, should be done by the shop and not reported to this activity. If on loan to the shop, report time to Activity 1000.

Equipment being serviced should be recorded along with the total hours spent on it on the cost day card.

Crew Size | **Workers**

QTY

Determined by the specific work being performed.

P.P.E.

1) Base PPE

2) Respiratory Protection (1 strap dust mask)

Materials

Determined by the specific work being performed.

Job Specific Equipment

Determined by the specific work being performed.

Other References

Sub Activities

147 - Equipment Inventory and 210
162 - Misc. Equipment Service
171 - Clean NON-SNOW equipment
172 - Brush Paint and Scrape Equipment
173 - Service and clean SNOW equipment
175 - Snow and Ice Inspection

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Equipment Servicing	CODE	2810

Work Method

Examples of work to be reported to this activity:

1. Wash and clean equipment (report non-snow equipment to subactivity 174, snow equipment to subactivity 173)
2. Wiper blade replacement
3. Change mower blades
4. Lubricate grease fittings, door hinges
5. Change small tires such as on pickup trucks, cars, or small trailers
6. Equipment inventory and 210 sales
7. Scraping and brush painting equipment (no spray paint)
8. Any work done in conjunction of fall or spring equipment inspections

Special Considerations

If performing any work for the shop, the work needs to be recorded in M5. Peoplesoft will not capture time from M5, so payable time will need to be entered manually.

		APPROVED BY	
		Director, Highway Maintenance	
Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Buildings and Grounds Maintenance	CODE	2830

Purpose

General housekeeping, mowing and minor maintenance of the buildings and grounds at the District, Subdistrict, Unit and other maintenance facility locations.

Category Non-Road

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule and perform this activity throughout the year as needed.

Reporting | **Reporting Units** Person Hours

Accomplishment is total person hours worked.

This activity only includes minor maintenance typically taking less than 1 hour, and general housekeeping. Any major improvements, repairs or modifications should be conducted under the supervision of the Facilities Manager and reported to the appropriate facility management activity. When loaned out to the Facilities Manager, report time to Activity 1010.

Report any road material handling to Activity 2840. Report any maintenance work done to a rest park or weigh station to Activity 2720.

Crew Size | **Workers**

QTY

Determined by the specific work being performed.

P.P.E.

Base PPE

Materials

Determined by the specific work being performed.

Job Specific Equipment

Determined by the specific work being performed.

Other References

Sub Activities

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Buildings and Grounds Maintenance	CODE	2830

Work Method

Determined by the specific work being performed.

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Materials Handling and Storage	CODE	2840

Purpose

The handling and storage of materials for routine roadway maintenance activities, excluding snow and ice control materials. Reporting includes the loading, hauling, unloading, mixing, stockpiling and storage of materials. This activity is only to capture handling of roadway repair material. Actual use of those materials are reported to the specific activity.

Category Non-Road

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule and perform this work throughout the year as needed.

Reporting | **Reporting Units** Person Hours

Accomplishment is the total person hours worked.

Do not report materials to this activity. Materials are reported to the specific activity when they are used.

Report snow and ice material handling to Activity 2650.

This activity is only to report the handling of maintenance materials, which are directly used on the road. Transport of supplies (such as state maps to rest parks) or transfer of equipment from one INDOT location to another should be reported to Activity 2890.

See the work method for examples of this activity.

Crew Size | **Workers**

QTY

Determined by the specific work being performed.

P.P.E.

Base PPE

Materials

Do not report materials to this activity.

Job Specific Equipment

Determined by the specific work being performed.

Other References

Sub Activities

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Materials Handling and Storage	CODE	2840

Work Method

Examples of work to report to this activity are:

1. Pipes - hauling pipe from vendor to unit for storage, staging or organizing in yard.
2. Signs and sign posts - staging or organizing in yard, unloading sign order from LSC delivery truck
3. Bituminous material - sending a tanker to emulsion plant, hauling cold mix from vendor
4. Aggregates - hauling from quary to unit or remote stockpile, staging in yard
5. Guardrail - hauling parts from vendor or District lot to unit
6. Paint - unloading delivery truck.
7. Transporting salvage material from a contract to an INDOT location.

Special Considerations

Materials should be handled as little as possible to minimize damage, segregation, spillage, and degradation. Utilize proper loading techniques at all times. Improper material handling can cause issues if INDOT tries to go back on a material supplier for not meeting specifications.

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Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Other Support Activities	CODE	2890

Purpose

Other overhead or support activities that are not specifically identified as separate activities. Includes work such as transferring equipment from one INDOT location to another, transporting equipment to be serviced, or delivering supplies to rest parks.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule and perform this work throughout the year as needed.

Reporting | **Reporting Units** Person Hours

Accomplishment is reported in person hours.

If using this activity for equipment transfer, only report the equipment hours the piece of equipment was actually operated or driven.

Transport of equipment for servicing is reported to Sub Activity 721.

Transport of roadway materials should be reported to Activity 2840.

If supplies are being transported, do not report to the materials section.

Crew Size	Workers QTY
Determined by the specific work activity to be performed	

Job Specific Equipment

	QTY
Determined by the specific work activity to be performed	

P.P.E.

1) Base P.P.E.

Materials

Determined by the specific work activity to be performed

Other References

Sub Activities

721 – Equipment Transport for Servicing

Average Daily Production	Person Hours	EFFECTIVE DATE	October 1, 2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Other Support Activities	CODE	2890

Work Method

Determined by the specific work being performed.

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	October 1, 2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Major Surface/Shoulder Improvements	CODE	2991

Purpose

Major, non-routine road or shoulder improvement projects performed by INDOT forces that are not covered under other activities. Any work covered under this activity needs to be identified and planned for with District approval.

See the Work Method for examples of work to report to this activity.

Category Roadway/Drainage

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☒ Plan Location

Scheduling & Coordination

Schedule and perform this work throughout the year, as weather conditions permit, depending on specific work being performed.

Reporting | **Reporting Units** Person Hours

Accomplishment is total person hours worked. Make sure all equipment and materials used in the project are captured and recorded on the work order.

If paving more than 1/2 mile continuous, constructing a new or extending an existing turn lane, or applying a double or triple seal coat, report to the appropriate sub-activity.

At copy of the District or Central Office Approval must be attached to the work order.

Ensure a detailed description of the work is included in the comments section.

Crew Size | **Workers**

QTY

Determined by the specific work to be performed.

P.P.E.

Base PPE

Materials

Determined by the specific work to be performed.

Job Specific Equipment

Determined by the specific work to be performed.

Other References

Sub Activities

729 - Major Paving

730 - New Lane Construction

731 - Multiple Application Seal Coat

732 - Major Patching

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Major Surface/Shoulder Improvements	CODE	2991

Work Method

Examples of work to report to this activity:

1. Roadway reconstruction or full depth patching greater than 100' in any single location (Subactivity 732). Any such work less than or equal to 100' in length should be reported to Activity 2020.
2. Roadway paving (Subactivity 729). Any such work up to 1/2 mile in continuous length should be reported to Activity 2030.
3. New lane construction (Subactivity 730), such as a new turn lane or passing blister where none currently exist. Repaving or patching existing turn lanes should be reported to the appropriate activity.
4. Constructing new shoulders where none currently exist. Reconditioning or patching existing shoulders should be reported to the appropriate activity.
5. Constructing new parking lot or access road on state property.
6. Double or triple application seal coats (mainline or shoulder - Subactivity 731). A written request must be made to and approved by the State Maintence Director prior to scheduling this type work.

Special Considerations

When performing major road work, make sure to consult with the District pavement engineer to ensure proper materials, techniques, and specifications are being followed.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Support Work Assignments	CODE	7000

Purpose

Report person hours of personnel (including winter transfer and summer hire personnel) assigned to perform support work assignments (physicals, drug testing, clerical work,etc.).

Category Non-Road

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

This activity should not be indentified for routine or daily assignment and should be used minimally.

Reporting | **Reporting Units** Person Hours

1. This activity is typically used for CDL physicals and drug testing.
2. Teambuilding or other functions not specific to training may be reported to this activity.
2. Any work in support of another activity should be reported to that specific activity.
3. Any minor equipment work is reported to Activity 2810.
4. Any minor housekeeping and building/grounds maintenance is reported to Activity 2830.
5. Anywork beyond minor repairs/maintenance should be loaned out and conducted under the supervision of the shop foreman or facilities manager.

Crew Size | **Workers**

QTY

P.P.E.

Materials

Job Specific Equipment

Other References

Sub Activities

65 - Administration Service: Administrative/Clerical/Secretarial

66 - Drug/CDL Testing, Physcial, Labor Relations

67 - Hoosier Helper

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2016

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Support Work Assignments	CODE	7000

Work Method

Special Considerations

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Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2016

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Sheet Sign Modernization	CODE	8100

Purpose

System modernization and upgrade to meet current standards. Systematic replacement of existing sheet signs, directional markers, mileposts, and hazard markers to restore safe control of traffic flow, provide uniform/adequate reflectivity, legibility of all existing traffic signage, and comply with federally proposed minimum sheet sign reflectivity standards. This activity will allow for coordination of sign removal from inventory.

Work that changes the features inventory (removing, moving, or new signs) should be reported to activity 8200

Category Roadway/Drainage

- ☒ **PM**
- ☒ **QA**
- ☒ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

This activity can be scheduled year round, and shall be based on an 18 year sign replacement schedule

Entire roads should be scheduled as corridor resign to insure uniformity of signs. Signs 6 years old or newer do not need to be replaced during the corridor resign

Technical Services provides the resigning plan for the district

Overhead signage should be scheduled separately to best utilize equipment and labor

Coordinate with other units to facilitate traffic control as needed

Reporting

Reporting Units Signs

Accomplishment equals each new attached sign. There can be multiple new signs (accomplishments) on one post. There is zero accomplishment for sign removals.

Crew Size **2 Workers**

	QTY
Laborer	1
Crew Leader	1

Job Specific Equipment

Aerial Bucket Track as needed	1
Pickup truck as needed	1

P.P.E.

1) Base PPE

2) Safety Harness / Fall Protection if using lift

Materials

Spec Book 802.02

Posts, Anchors, Brackets, Aluminum Bars, Stiffeners, Sheet Signs

Other References

Activity 8100 QA Form

IMUTCD Chapter 2A

INDOT Standard Specification / Drawings section 802

Sheet Sign Replacement Cycle OM 11-01

Sub Activities

Average Daily Production	20-24 Signs	EFFECTIVE DATE	July 1, 2016

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Sheet Sign Modernization	CODE	8100

Work Method

1. Review sign log
2. Call in locates 48 hours before road section will be resigned. Any anchor or post that will be driven **or removed** from the ground requires a locate. (This does not include removing post from anchor)
3. Ensure all signs for the day are loaded on the vehicle as well as any posts and hardware that may possibly be needed.
4. Place work area safety devices.
5. Refer to Standard Drawings to determine proper height and offset from roadway or walkway, and sign size.
6. Measure offsets and heights of current sign. Laser or line level may be required to determine height above roadway.
7. Determine if current post and anchor can be reused or if sign needs to be moved to meet current standards. If new post is required, refer to Sign Post Selection Guide. Signs shall not be placed on utility posts unless a separate agreement with the utility exists.
8. If the sign is leaning, the post and anchor need to be removed and re-driven. No more than 2" of the anchor shall remain above the ground.
9. Remove existing sheet sign. May use latter/lift to remove sign from post or remove post and sign from anchor, then remove the sign while on the ground.
10. If a new post is required, cut the post to correct length to achieve proper height of the sign. Secure in anchor with corner bolts.
11. Install date sticker on what will be the lower back corner of the sign that will be closest to the roadway.
12. Attach sign to post with new hardware. Lock washer and nut or lock nut shall be on the back of the sign, nylon then metal washer on the sign face. Holding bolt head against sign face, tighten nut from the back of the sign. Nuts shall be tightened sufficiently to hold sign firmly to post, but caution should be used not to twist sign sheeting.
13. Step back and review installation. Ensure no obstructions are present, and that the sign is correctly installed.
14. Collect tools and all materials. Ensure the worksite is free of debris.
15. Remove work area safety devices and move to next location.

Special Considerations

Crews should be provided with a packet of Standard Drawings applicable to sign operations

If drilling holes in the sign, drill from the front of sign to reduce sheeting tear.

APPROVED BY
Director, Highway Maintenance

Average Daily Production	20-24 Signs	EFFECTIVE DATE	July 1, 2016

Activity 8100 - Sheet Sign Modernization QA Form

Road: _____ **Type:** _____
Type of post: _____ **Urban/rural (U or R):** ___
Message: _____
Year of sign: _____

_____ Correct height
_____ Correct application of post
_____ Sign angle
_____ Date sticker, or other method, visible

_____ Bolts and washers correct
_____ Sign visible to motorist
_____ Correct size for conditions
_____ Sign plumb
_____ Serious deficiency

_____ % Score for sign location

Date:

Starting point:

Sub:Albany

Road: _____ **Type:** _____
Type of post: _____ **Urban/rural (U or R):** ___
Message: _____
Year of sign: _____

_____ Correct height
_____ Correct application of post
_____ Sign angle
_____ Date sticker, or other method, visible

_____ Bolts and washers correct
_____ Sign visible to motorist
_____ Correct size for conditions
_____ Sign plumb
_____ Serious deficiency

_____ % Score for sign location

Road: _____ **Type:** _____
Type of post: _____ **Urban/rural (U or R):** ___
Message: _____
Year of sign: _____

_____ Correct height
_____ Correct application of post
_____ Sign angle
_____ Date sticker, or other method, visible

_____ Bolts and washers correct
_____ Sign visible to motorist
_____ Correct size for conditions
_____ Sign plumb
_____ Serious deficiency

_____ % Score for sign location

Road Ave

Evaluator Initials:

Road: _____ **Type:** _____
Type of post: _____ **Urban/rural (U or R):** ___
Message: _____
Year of sign: _____

_____ Correct height
_____ Correct application of post
_____ Sign angle
_____ Date sticker, or other method, visible

_____ Bolts and washers correct
_____ Sign visible to motorist
_____ Correct size for conditions
_____ Sign plumb
_____ Serious deficiency

_____ % Score for sign location

Road: _____ **Type:** _____
Type of post: _____ **Urban/rural (U or R):** ___
Message: _____
Year of sign: _____

_____ Correct height
_____ Correct application of post
_____ Sign angle
_____ Date sticker, or other method, visible

_____ Bolts and washers correct
_____ Sign visible to motorist
_____ Correct size for conditions
_____ Sign plumb
_____ Serious deficiency

_____ % Score for sign location

Road: _____ **Type:** _____
Type of post: _____ **Urban/rural (U or R):** ___
Message: _____
Year of sign: _____

_____ Correct height
_____ Correct application of post
_____ Sign angle
_____ Date sticker, or other method, visible

_____ Bolts and washers correct
_____ Sign visible to motorist
_____ Correct size for conditions
_____ Sign plumb
_____ Serious deficiency

_____ % Score for sign location

Road: _____ **Type:** _____
Type of post: _____ **Urban/rural (U or R):** ___
Message: _____
Year of sign: _____

_____ Correct height
_____ Correct application of post
_____ Sign angle
Date sticker, or other method, visible

_____
_____ Bolts and washers correct
_____ Sign visible to motorist
_____ Correct size for conditions
_____ Sign plumb
_____ Serious deficiency

_____ % Score for sign location

Road: _____ **Type:** _____
Type of post: _____ **Urban/rural (U or R):** ___
Message: _____
Year of sign: _____

_____ Correct height
_____ Correct application of post
_____ Sign angle
Date sticker, or other method, visible

_____
_____ Bolts and washers correct
_____ Sign visible to motorist
_____ Correct size for conditions
_____ Sign plumb
_____ Serious deficiency

_____ % Score for sign location

Road: _____ **Type:** _____
Type of post: _____ **Urban/rural (U or R):** ___
Message: _____
Year of sign: _____

_____ Correct height
_____ Correct application of post
_____ Sign angle
Date sticker, or other method, visible

_____
_____ Bolts and washers correct
_____ Sign visible to motorist
_____ Correct size for conditions
_____ Sign plumb
_____ Serious deficiency

_____ % Score for sign location

Road: _____ **Type:** _____
Type of post: _____ **Urban/rural (U or R):** ___
Message: _____
Year of sign: _____

_____ Correct height
_____ Correct application of post
_____ Sign angle
Date sticker, or other method, visible

_____
_____ Bolts and washers correct
_____ Sign visible to motorist
_____ Correct size for conditions
_____ Sign plumb
_____ Serious deficiency

_____ % Score for sign location

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Sheet Sign Maintenance	CODE	8110

Purpose

To restore and maintain adequate control and guidance of traffic; repair, reset, and replace existing sheet signs, directional markers, mileposts, and hazard markers.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Repair or replace stop, yield, and other priority signs without waiting for routine scheduling. Other deficiencies should be scheduled. Signs that are leaning more than 5 degrees, have damage, or have poor legibility should be scheduled to for maintenance. New sign replacements should be made with installations which comply with current standards. Be specific when scheduling signs for repair; exact locations and necessary material should be with crew to eliminate comebacks whenever possible.

Reporting | **Reporting Units** Signs

The following are considered one accomplishment: attaching a new sign to a post; replace a damaged post; re-install anchor or install flange on anchor to repair or maintain integrity of the sign installation. The maximum accomplishment per structure is equal to the number of signs on the structure.

Straightening a post in place is not an accomplishment, and should not be done. Instead, the post/anchor should be removed and reinstalled close to the current location, or an anchor with flanges should be used.

A new sign at a new locations is reported to Activity 8200

Crew Size **2 Workers**

	QTY
Laborer	1
Crew Leader	1

P.P.E.

1) Base PPE

2) Safety Harness / Fall Protection if using lift

Job Specific Equipment

Aerial Bucket Track as needed	1
Pickup truck as needed	1

Materials

Spec Book 802.02

Posts, Anchors, Brackets, Aluminum Bars, Stiffeners, Sheet Signs

Other References

Activity 8100 QA Form

IMUTCD Chapter 2A

INDOT Standard Specification / Drawings section 802

Sub Activities

Average Daily Production	14 – 18 Signs	EFFECTIVE DATE	July 1, 2016

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Sheet Sign Maintenance	CODE	8110

Work Method

1. Review sign log and locations that need maintenance
2. Call in locates 48 hours before road section will be repaired. Any anchor or post that will be driven **or removed** from the ground requires a locate. (This does not include removing post from anchor)
3. If a priority sign needs repaired before a locate can be performed use a temporary sign mounted on temporary supports.
4. Ensure all signs for the day are loaded on the vehicle as well as any posts and hardware that may possibly be needed.
5. Place work area safety devices.
6. Refer to Standard Drawings to determine proper height and offset from roadway or walkway, and sign size.
7. Measure offsets and heights of current sign. Laser or line level may be required to determine height above roadway.
8. Determine if current post and anchor can be reused or if sign needs to be moved to meet current standards. If new post is required, refer to Sign Post Selection Guide. Signs shall not be placed on utility posts unless a separate agreement with the utility exists.
9. If the sign is leaning, the post and anchor need to be removed and re-driven. No more than 2" of the anchor shall remain above the ground.
10. Remove existing sheet sign. May use ladder/lift to remove sign from post in the air or remove post from anchor, then remove the sign while on the ground.
11. If a new post is required, cut the post to correct length to achieve proper height of the sign. Secure in anchor with corner bolts.
12. Install date sticker on what will be the lower back corner of the sign that will be closest to the roadway.
13. Attach sign to post with new hardware. Lock washer and nut or lock nut shall be on the back of the sign, nylon then metal washer on the sign face. Holding bolt head against sign face, tighten nut from the back of the sign. Nuts shall be tightened sufficiently to hold sign firmly to post, but caution should be used not to twist sign sheeting.
14. Step back and review installation. Ensure no obstructions are present, and that the sign is correctly installed.
15. Collect tools and all materials. Ensure the worksite is free of debris.
16. Remove work area safety devices and move to next location.

Special Considerations

Crews should be provided with a packet of Standard Drawings applicable to sign operations

If drilling holes in the sign, drill from the front of sign to reduce sheeting tear.

APPROVED BY	
Director, Highway Maintenance	
Average Daily Production	**14 - 18 Signs**
EFFECTIVE DATE	July 1, 2016

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Panel Sign Maintenance	CODE	8120

Purpose

Repair, reset, or replace panel traffic signs to restore and maintain adequate control and guidance of traffic, lost due to accident or storm damage or vandalism. This activity does not include installation of new signs at new locations or new signs required as a result of change in sign standards.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Perform this activity as required throughout the year. Signs should be repaired as soon as possible after damage.

Reporting | **Reporting Units** Signs

Accomplishment is;

- Repair sign on site; replace demountable copy, shields, re-attach I-beam to footer
- Remove sign, return to shop for repairs to sign, make repairs to footer if necessary, re-install on site (all 1 accomplishment)

Only 1 accomplishment per panel sign repair

Crew Size 3-4 Workers

	QTY
Crew Leader	1
Laborer	2-3

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

65' Platform Truck
Auger/Crane
2 ton Stakebed
Trailer

*Traffic Control Equipment is NOT shown here

P.P.E.

1) Base P.P.E.
2) Safety Harness/Fall Protection when using aerial lift

Materials

Panel Sign	919.01	Edge Molding	919.01
I Beams	910.14	Demountable Copy	919.01
Overlay	919.01		
Shields	919.01		

Other References

IMUTCD Chapter 2
INDOT Standard Specification section 802
INDOT Standard Drawings section 802
Wind Load Selection Guide (for I-Beams)
OM 11 - 01

Sub Activities

Average Daily Production	2 - 4 Signs	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Panel Sign Maintenance	CODE	8120

Work Method

Schedule required traffic control

1. Place work zone safety devices

2. Inspect structure, sign, footers to determine which materials are needed to effect repairs.

3. If possible, make repair at this time or ensure safety of structure and motoring public (ie: lay sign down, bring sign/structure to shop).

On site repairs.

4. Reset I-beam, replace keeper plates and nuts bolts and washers as needed. See standard drawing E 802-SNGP-05 for torque values

5. Replace demountable copy, shields, panel bolts, etc. if necessary

6. If repairs cannot be made in the field, remove sign and or structure and transport to shop for repairs

7. Clean area of depris

8. Remove traffic control devices

9. Order materials for sign repair from LSC, panels, I-beams, fuse plates ect.

10. Effect repairs on sign or structure and transport to site and re-install

11. Schedule traffic control if necessary

12. Transport to site and re-install panel sign

13. Clean area of debris

14. Remove traffic control

Mobilize to next assignment

Special Considerations

When new footers are required, the installation shall meet current design standards as specifed in the Manual on Uniform Traffic Control Devices and Wide Flange Post Selection Table from the Standard Drawings.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	2 - 4 Signs	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Panel Sign Overlay	CODE	8121

Purpose

Panel Sign modernization and upgrade to current panel sign standards using panel overlays. Overlay existing panel signs, with panel overlay to restore and maintain adequate control and guidance of traffic and comply with federal minimum panel sign reflectivity standards. This activity does not include installation of new panel signs at new locations, which would add to the feature inventory

Category Roadway/Drainage

- ☒ **PM**
- ☒ **QA**
- ☒ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

Corridor replacement plan based upon a 20 year panel sign age replacement.

Panel overlays shall be ordered twice yearly to meet work plan requirements.

Reporting | **Reporting Units** Square Feet

Accomplishment is reported in square footage of overlay installed

All work including pre-drilling, overlay installation, etc shall be reported to one Work Order

This activity does not include installation of new panel signs at new locations; this activity is reported to 8200.

Crew Size 3 Workers

	QTY
Crew Leader	1
Laborer	2

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

65' Platform Truck

*Traffic Control Equipment is NOT shown here

P.P.E.

1) Base P.P.E.

2) Safety Harness/Fall Protection when using aerial lift

Materials

Edge Molding	919.01
Overlay	919.01

Other References

IMUTCD Chapter 2

INDOT Standard Specification section 802

INDOT Standard Drawings section 802

Sub Activities

Average Daily Production	300 - 450 Square Feet	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Panel Sign Overlay	CODE	8121

Work Method

1. Pre-drill panel overlays around outer edges at approximately 16" intervals and approximately 16" intervals throughout the overlay section. This will prevent screw breaking and panel overlay buckling
2. Schedule required traffic control if neccessary
3. Place work area safety devices
4. Remove any existing demountable copy and shields; flat edge floor scraper or flat shovel works well for this.
5. Ensure surface of panels is smooth. Use grinder or spade to remove all rivets.
6. Install Overlay
   - -Attach straight edge to bottom of panel sign using clamps
   - -Start at lower left next to edge molding and move across row by row
   - -Attach overlays with #8 3/4" stainless steel, self tapping screws around each piece with 16" spacing both horizontal and vertical, ensure screws do not break during installation process. If it does break, tap another screw next to it.
7. Step back from site and review installation
8. Collect tools and clean up all materials and debris from work site
9. Remove safety devices

Special Considerations

Overlay should be fabricated to utilize the existing panel sign's current structure. The overlay can extend 6" on all size panels to facilitate larger font messages if necessary.
Consider purchasing drywall drill to help prevent screws from breaking.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	300 - 450 Square Feet	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Panel Sign Inspection/Minor Maintenance	CODE	8125

Purpose

Conduct inspections of panel sign installations to insure structure is sound and message is intact; this includes fasteners, nuts, bolts, keeper plates, footers, and overall appearance of the sign. This activity also includes minor repairs that can be made from the ground. Example: all footer bolts torqued and burred to specifications, keeper plates are positioned correctly, foundations are clear of soil buildup etc. .

Category Roadway/Drainage

- ☒ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

Inspect approximately 1/5 of feature inventory each year. This activity can be scheduled in any weather.

Reporting

Reporting Units Structures

Accomplishment is per structure inspected

Inspection form to be completed and turned into supervisor

Crew Size 2 Workers

	QTY
Crew Leader	1
Laborer	1

*Traffic Control Personnel are NOT shown here

P.P.E.

Base PPE

Materials

Job Specific Equipment

Pick-up truck
Torque Wrench
Shovel
Chisel

*Traffic Control Equipment is NOT shown here

Other References

IMUTCD Chapter 2
INDOT Standard Specification section 802
INDOT Standard Drawings section 802

Sub Activities

Average Daily Production	15 - 20 Structures	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Panel Sign Inspection/Minor Maintenance	CODE	8125

Work Method

1. Place traffic control devices if needed.
2. Inspect structure using panel sign inspection form.
   - Ensure message is clearly legible from road
   - Ensure sign height is correct
   - Ensure fuse plate is in correct location, panel clips are installed correctly, and the correct number and size of I-beams are used.
   - Clean soil and debris around footer break away system
   - Ensure base height meets standards
   - Check that proper size keeper plates are used
   - Test torque values of all base bolts to ensure they are not too loose or tight
     - If necessary, correct the torque of the bolts
   - Ensure all base bolts are properly burred. If necessary, burr the base bolts
   - Check for date sticker on back of sign
5. Collect tools and materials. Ensure area is clear of debris.
6. Remove traffic contol devices.
7. Move to next location.

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	15 - 20 Structures	EFFECTIVE DATE	July 1, 2013

INDOT – Panel Sign Inspection Form

Inspection Date: _____ Inspectors: _____

Route: _____ RP: _____ Direction: _____

Location Description: _____

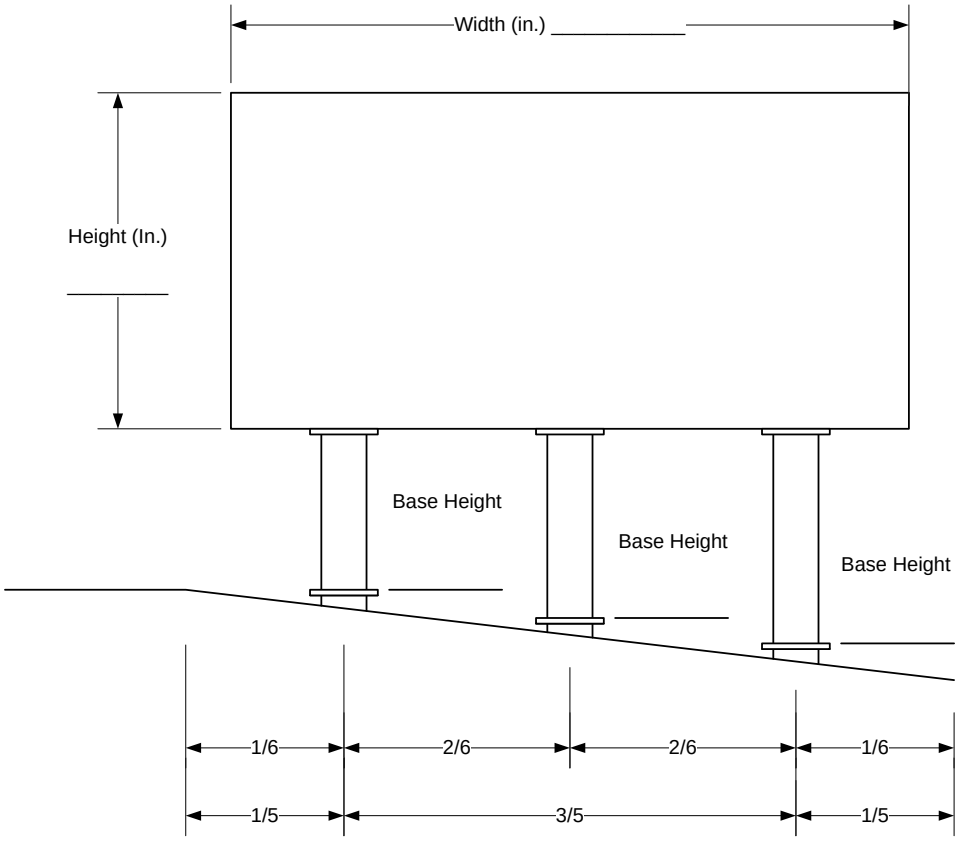
Latitude: _____ Longitude: _____ Position (RT,LT, Median) _____

Type of Sign: Overlay: ☐ Demountable Copy: ☐

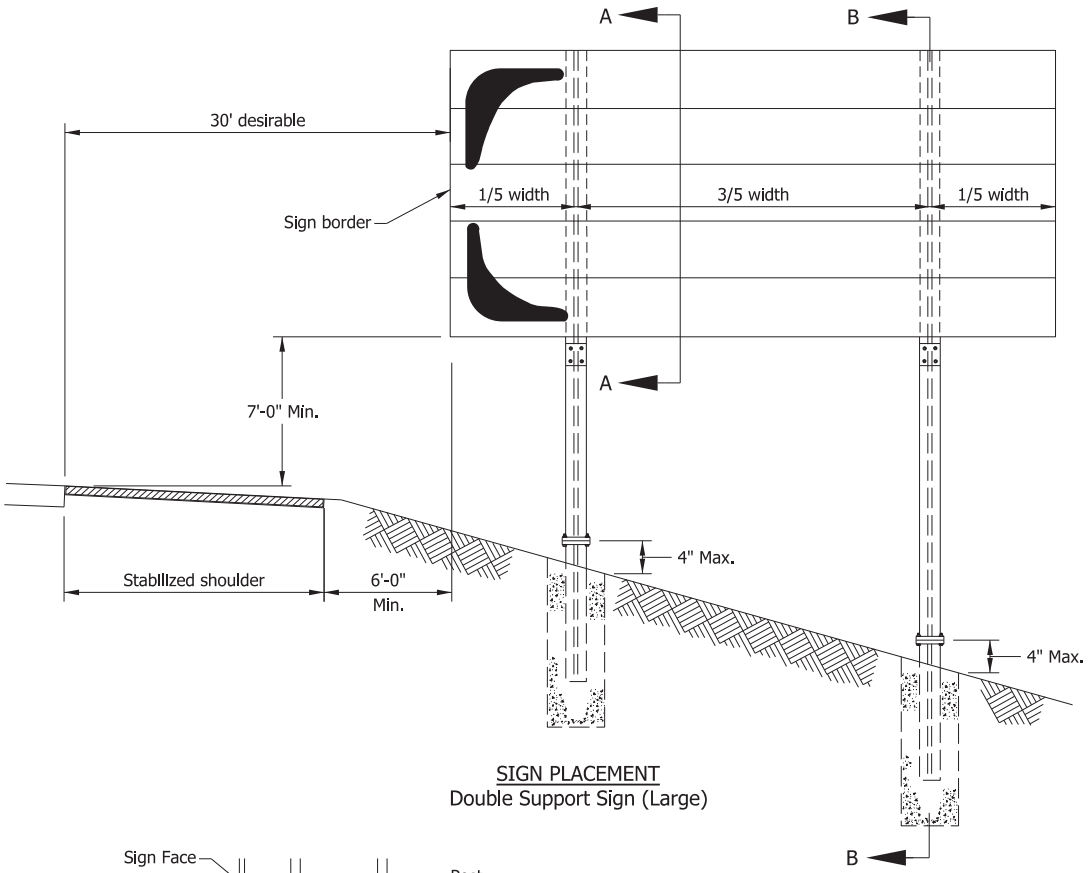
Message legible/reflective	☐ Yes	☐ No	Proper size keep plates installed	☐ Yes	☐ No
Sign is at correct height	☐ Yes	☐ No	Base Bolts torqued to specs	☐ Yes	☐ No
Sign has proper mounting: *(Fuse Plates, panel clips, correct number, size and location of I-Beams)*	☐ Yes	☐ No	Base bolts burred	☐ Yes	☐ No
All Footer break away system clear of soil and debris	☐ Yes	☐ No	Date sticker placed *(Located lower roadside corner)*	☐ Yes	☐ No
All base heights less than or equal to 4 inches	☐ Yes	☐ No			

Date of Sticker _____

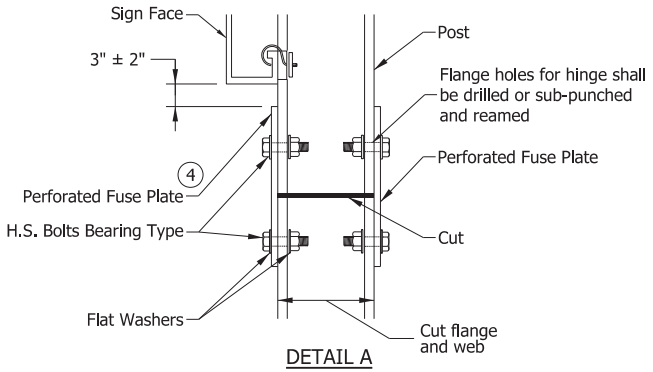
Fill in Drawing below with all the information including message of the sign



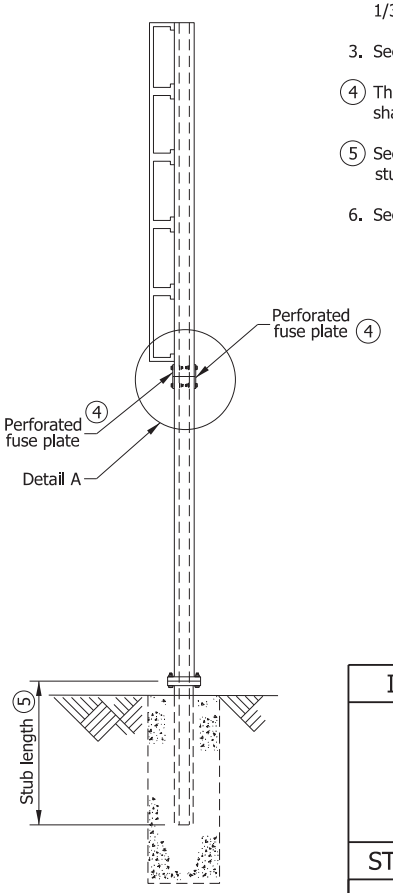
Comments:



SIGN PLACEMENT
Double Support Sign (Large)



DETAIL A



SECTION B-B

NOTES:

1. No more than one W10 x 19 or larger post can be used in a 7'-0" path. No more than two W8 x 18 or smaller posts can be used in a 7'-0" path.
2. For 3 post installation, the edge of sign to post is 1/6 width of sign and 1/3 width of sign between posts.
3. See Standard Drawing E 802-SNGP-04 for base plate details.
4. The distance from the top of the fuse plate to the bottom of the sign shall be the same for all posts.
5. See Standard Drawing E 802-SNGP-07 for required stub length.
6. See Standard Drawing E 802-SNGP-03 for Section A-A.

INDIANA DEPARTMENT OF TRANSPORTATION

SIGN PLACEMENT

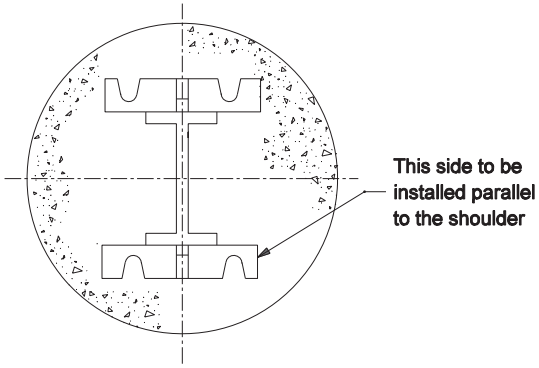
SEPTEMBER 2013

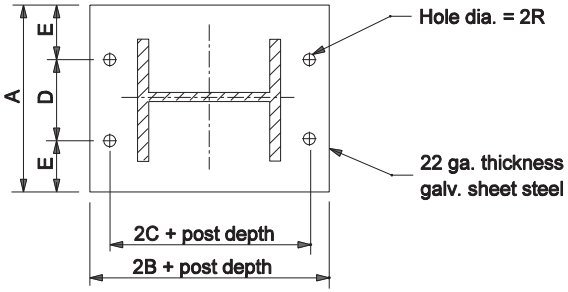
STANDARD DRAWING NO. E 802-SNGP-01

ALFREDO B. HANZA REGISTERED No. 60020657 STATE OF INDIANA PROFESSIONAL ENGINEER

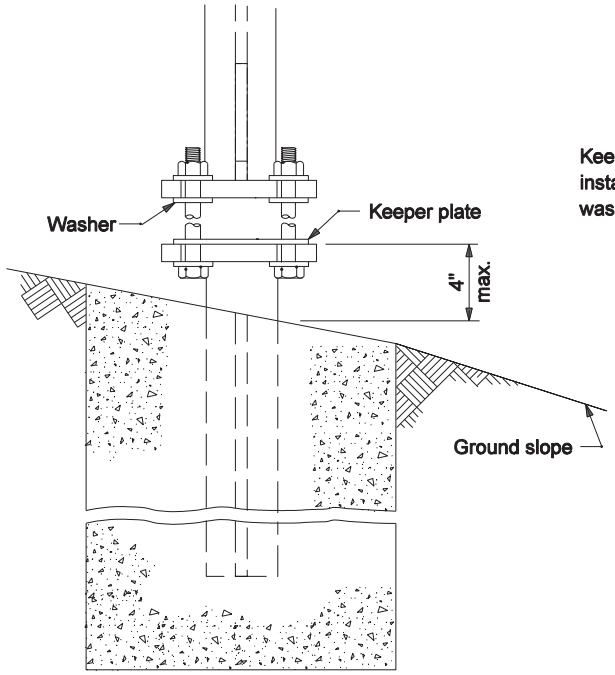
/s/ Alfredo B. Hanza 02/05/13
DESIGN STANDARDS ENGINEER DATE

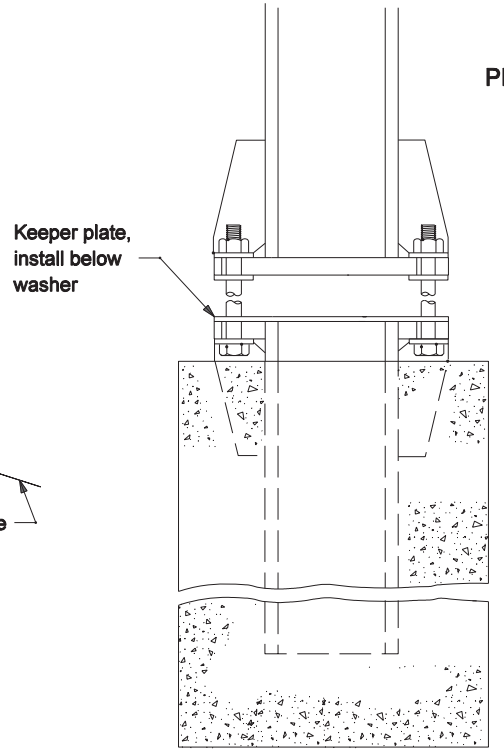
/s/ Mark A. Miller 03/27/13
CHIEF ENGINEER DATE





KEEPER PLATE





PROCEDURE FOR ASSEMBLY OF BASE CONNECTION:

Assemble post to stub with bolts. One flat washer on each bolt shall be placed between the top of the keeper plate and bottom of the top base plate. Shim as required to plumb post.

Tighten all bolts the maximum possible with 12" to 25" wrench to bed washers and shims and to clean bolt threads, then loosen each bolt in turn and retighten bolts in a systematic order to the prescribed torque. See table on Standard Drawing E 802-SNGP-05 for dimensions.

Burr threads at junction with nuts using a center punch to prevent nut loosening.

Stubs shall be plumb and base plate shall be leveled and physically held level until the concrete sets.

INDIANA DEPARTMENT OF TRANSPORTATION

WIDE FLANGE SIGN SUPPORT BASE

March 2004

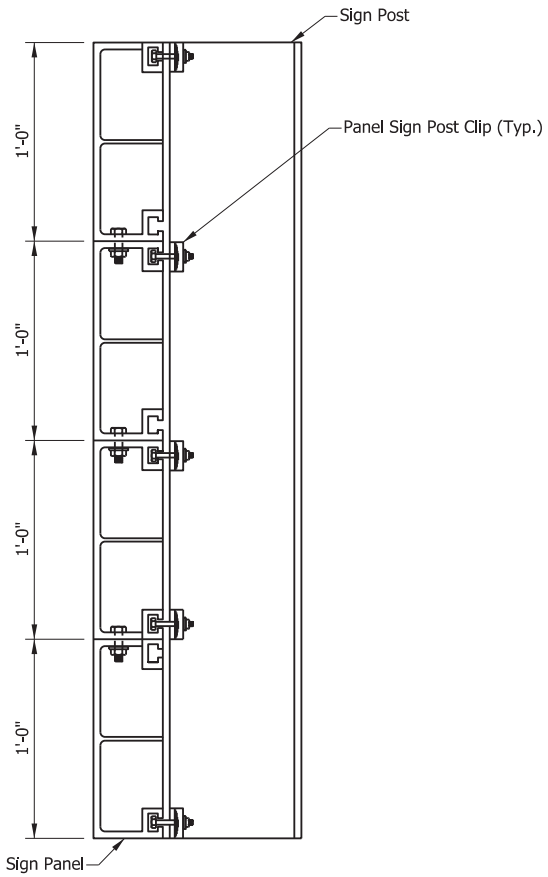
STANDARD DRAWING NO. E 802-SNGP-02

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

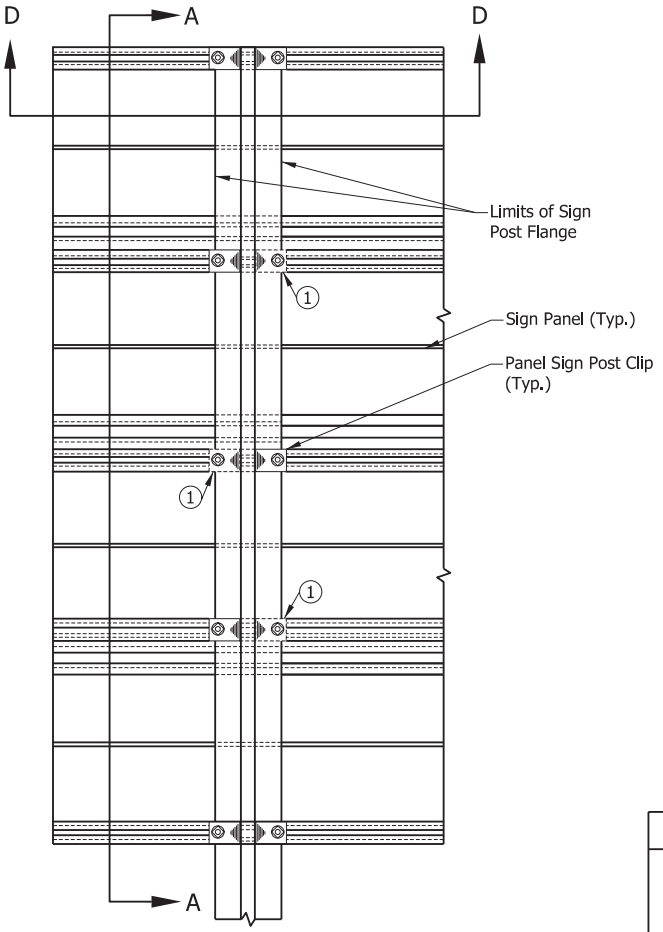
DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 3-01-04
DESIGN STANDARDS ENGINEER DATE

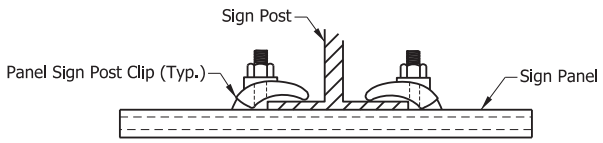
/s/ Richard K. Smutzer 3-01-04
CHIEF HIGHWAY ENGINEER DATE



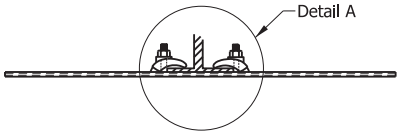
SECTION A-A



ELEVATION
(View from Back of Sign)



DETAIL A



SECTION D-D

NOTES:

(1) Required for sign width greater than 24'.

INDIANA DEPARTMENT OF TRANSPORTATION

SIGN PLAN DETAILS

SEPTEMBER 2013

STANDARD DRAWING NO. E 802-SNGP-03

ALFREDO B. HANZA REGISTERED No. 60020657 STATE OF INDIANA PROFESSIONAL ENGINEER

/s/ Alfredo B. Hanza 02/05/13
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 03/27/13
CHIEF ENGINEER DATE

BASE PLATE & STIFFENER PLATE DATA TABLE

Post Size	Bolt Size	Torque in. - lb	Wt. of 4 Plates (One Post) ,lb	Wt. of 4 Stiffeners (One Post) ,lb	A	B	C	D	E	R	d4	t_1	t_2	W
W6 x 9	½" ø x 2¼ "	140	5.10	3.33	4½"	2"	1⅜"	2½"	1"	9/23"	1⅜"	½"	½"	3/16"
W8 x 10	⅝" ø x 2½ "	300	6.38	4.07	5"	2¼"	1½"	2⅞"	1 1/16"	11/32"	1½"	"	"	"
W8 x 13	¾" ø x 3"	500	12.6	7.97	6"	2½"	"	3⅛"	1 7/16"	13/32"	1¾"	¾"	¾"	¼"
W8 x 15	"	"	"	"	"	"	"	"	"	"	"	"	"	"
W8 x 18	"	"	"	"	"	"	"	"	"	"	"	"	"	5/16"
W10 x 19	1" ø x 3.¼"	700	14.04	8.66	"	2¾"	1½"	3⅝"	1 3/16"	17/32"	2¼"	¾"	¾"	5/16"

INDIANA DEPARTMENT OF TRANSPORTATION

SIGN DATA TABLES

SEPTEMBER 2002

STANDARD DRAWING NO. E 802-SNGP-05

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

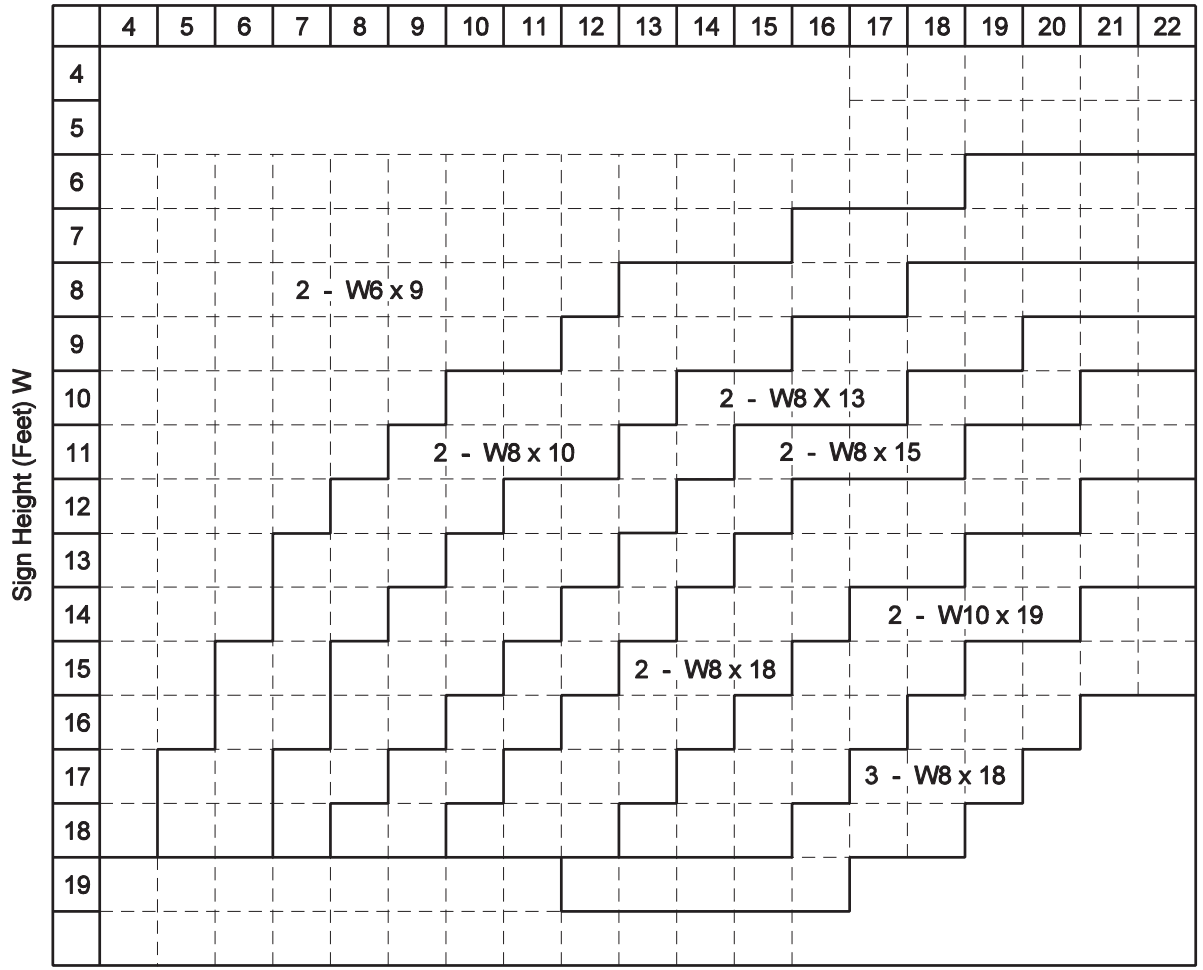
DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 9-03-02
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 9-03-02
CHIEF HIGHWAY ENGINEER DATE

Wide Flange Post Selection Table

Sign Width (Feet) L



INDIANA DEPARTMENT OF TRANSPORTATION

WIDE FLANGE POST SELECTION TABLE

MARCH 2004

STANDARD DRAWING NO. E 802-SNGS-12

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 3-01-04
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 3-01-04
CHIEF HIGHWAY ENGINEER DATE

INDIANA DEPARTMENT OF TRANSPORTATION (INDOT)

Activity 8125 - Panel Sign Inspection/Minor Maintenance Quality Assurance Evaluation

District: _____ **Evaluation Date:** _____

Route: _____ **RP Start:** _____ **End:** _____ **Direction:** _____

Date Project completed: _____ **Evaluated by:** _____

Panel Score: 0%

S1 Message: _____ **Sign Year** _____
S2 Message: _____ **Sign Year** _____
S3 Message: _____ **Sign Year** _____
S4 Message: _____ **Sign Year** _____
S5 Message: _____ **Sign Year** _____

QA Type: Annual-- 5 signs on each of 2 corridors
OBSERVATIONS:

		S1	S2	S3	S4	S5	Avg
1	**Keeper Plate**						
0	No	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.0**
10	Yes						
2	**Base Bolts Torqued and Burred/Chiseled**	S1	S2	S3	S4	S5	Avg
0	Not proper torque or bolts burred/chiseled	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.0**
25	All torqued properly						
3	**Base Height (< 4 " above ground level and not buried)**	S1	S2	S3	S4	S5	Avg
0	No	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.0**
25	Yes						
4	**Sign Is Correct Height**	S1	S2	S3	S4	S5	Avg
0	No	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.0**
10	Yes						
5	**Proper Mounting (fuse plate location, panel clips, correct I-beam size, number, and location)**	S1	S2	S3	S4	S5	Avg
		0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.0**
0	No						
25	Yes						
6	**Date Sticker**	S1	S2	S3	S4	S5	Avg
0	No	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.0**
5	Yes						

cont.2

Activity 8125 - Panel Sign Inspection/Minor Maintenance
Quality Assurance Evaluation

Judgment of Evaluator (Evaluator's Comments Required) **continue**

TOTAL POINTS:

Observation #		1	2	3	4	5	6
Points		10	25	25	10	25	5

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Delineation Maintenance Program	CODE	8140

Purpose

The periodic replacement and repair or new installation of delineators on the highway system to provide adequate safety for the motorists. Delineators are installed in a series to indicate the alignment of the roadway. in accordance with the standards specified in the Manual on Uniform Traffic Control Devices

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Perform this activity as required throughout the year.

This activity can be performed in most weather conditions and is an ideal activity when crews are unable to complete their scheduled activity. (Example: Paint crew cannot paint due to rain or equipment failure)

Reporting **Reporting Units** Delineators

Each repair or installation of a delineator assembly is one accomplishment.

Posts used to mark assets (drains, culvers, etc) should not be reported to this activity. Reflective delineators should not be used to mark these assets.

Roadway crews that are primarily performing a different activity for the day, but repair one or two delineators during the course of the day may report the time and materials under the primary activity. However, there will be no accomplishment reported for the delineators repaired.

Reflectors repaired or installed on barrier wall or guardrail shall be reported to activity 8390

Crew Size **2 Workers**

	QTY
Laborer	2

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Pick-up truck	1

*Traffic Control Equipment is NOT shown here

P.P.E.

Base PPE

Materials

Delineator	910.15
Anchor	910.15
Buttons	926.02

Other References

IMUTCD Chapter 3F

Table 3F-1 MUTCD

Standard Drawing 802-SNGS-07

Standards and Specs Section 804

Sub Activities

Average Daily Production	45 - 70 Delineators	EFFECTIVE DATE	July 1, 2016

ACTIVITY	Delineation Maintenance Program	CODE	8140

Work Method

If anything is removed from the ground without a sleeve / anchor remaining or if a delineator posts will be driven into the ground, call in for locates at least 48 hours before work.

Management or supervisors should review routes for damaged delineation.

1. Place Traffic Control devices if needed.
2. Install, replace, or repair delineators on assigned routes and at specific locations. Delineators should be spaced 200 to 530 ft, on mainline tangent sections and 20 to 90 ft on horizontal curves or ramps; Refer to table 3F-1 in the MUTCD.
3. Install delineators 2 ft to 8 ft outside the outer edge of the shoulder; remain consistant with offset whenever possible; the color of the retroreflector device shall match the edgeline paint. Delineators should be mounted on suitable supports at a mounting height, measured vertically from the bottom of the lowest retroreflective device to the elevation of the near edge of the roadway; appproximately 4 feet.
4. Remove work area safety signs and devices if they were placed.

Special Considerations

		APPROVED BY	
		Director, Highway Maintenance	
Average Daily Production	**45 - 70 Delineators**	**EFFECTIVE DATE**	July 1, 2016

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Detour Work	CODE	8150

Purpose

Setting up, maintenance, and removal of detours to direct traffic through and around road closers due to activities such as railroad crossing work and bridge restrictions.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Detours / road closures lasting 24 hours or less should be handled by sub district maintenance operations or local law enforcement.

Coordinate and plan this activity with all district departments prior to yearly work plan development

Schedule this work throughout the year when necessary due to unforseen circumstances.

If routes not owned by the state will be used, there must be signed agreements with the owners prior to placement of detour.

Coordinate with communications office for public notifications, local and county officials, police and fire depts.

Notify vendor of all needed rental materials.

Reporting

Reporting Units Person Hours

Accomplishment is in Person Hours

This activity is only to be used for non-INDOT activity detours. Setting up and removing detours from other INDOT maintenance work, such as chip seals or pipe replacements, should be reported to the specific activity.

Crew Size — 2-3 Workers

	QTY
Crew Leader	1
Laborer	1-2

*Traffic Control Personnel are NOT shown here

P.P.E.

1) Base PPE

2) Safety Harness/Fall Protection when using aerial lift

Materials

Job Specific Equipment

Stake bed truck

Bucket truck

*Traffic Control Equipment is NOT shown here

Other References

Detour Plan

IMUTCD section 6A-01

Sub Activities

Average Daily Production	Person Hours	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Detour Work	CODE	8150

Work Method

1. Review detour plan.
2. Ensure all materials are available at job site.
3. Placement of detour shall start opposite to the flow of traffic.

   Place all signs on detour route before closure site. Closure site is at the start and finish point of detour

   Place road closed signs at starting point of detour and install barricades to begin traffic detour

   Place road closed signs and barricades at opposite closure site of detour (complete this simultaniously if possible)

   Last signs to be placed are the road closed signs and barricades at closure point if this point is different than the start of the detour. Closure site is when detour begins and ends; Closure point is actual work site.
4. Place appropriate lighting as necessary. Must be placed before sunset.
5. Drive through to ensure detour is performing as planned.
6. Perform any maintenance or changes to the detour as required througout detour period.
7. Remove detour starting at closure point and work backward through the detour in both directions at the same time if possible. If not possible, remove signs and barricades at closure point and work back to closure site, remove signs and barricades at this location; return to closure point and remove signs and barricades in opposite direction from closure point to closure site; the road is now open; remove signage from detour route.

Notify vendor the same day of opening to pick up rented materials.

Special Considerations

Special signs may be needed to notify motorist of businesses that are still open if closure site is different than closure point.

Pre-detour signs can be placed up to two weeks in advance of closure to communicate the coming event

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Traffic Sign Work Orders	CODE	8200

Purpose

Install a new sign at a new location, permenantly remove a sign, move a sign to a new location, or replace a sign with a different sign in order to respond to a need identified by Traffic Engineering. This activity should require changing the feature inventory.

This activity should not be used in conjunction with activity 8100

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Perform this work throughout the year as directed.

Reporting | **Reporting Units** Signs

Accommplishment: New sign installed at new location; sign permanently removed from inventory, move existing sign to new location or replace existing sign with a different sign. (not sign modernization activity).

Crew Size 2 Workers

	QTY
Crew Leader	1
Laborer	1

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Pick-up Truck	1
Bucket Truck if needed	1

*Traffic Control Equipment is NOT shown here

P.P.E.

1) Base PPE

2) Safety Harness/Fall Protection when using aerial lift

Materials

Post	802.02
Anchor	802.02
Sheet Sign	802.02

Other References

IMUTCD Chapter 2

INDOT Standard Specification section 802

INDOT Standard Drawings section 802

Post Selection Guide

Sub Activities

Average Daily Production	7 - 11 Signs	EFFECTIVE DATE	July 1, 2013

WORK PERFORMANCE STANDARD

ACTIVITY	Traffic Sign Work Orders	CODE	8200

Work Method

1. Review work order
2. Call in locates 48 hours before work will be performed
3. Place safety devices as necessary
4. Remove signs, posts, and anchors according to work order.
5. Refer to Standard Drawings for proper offset, height, and sign size
6. At work site, check offsets of posts and get grades using laser or line level
7. If new post is required refer to Sign Post Selection Guide
8. Install new post anchor if needed; refer to sign post selection guide; measure offset from roadway or shoulder; install anchor, only 2" of anchor above grade; use laser or line level to determine length of post required
9. Cut post to proper length determined by road class and sign location; insure ditch or back slope are considered when measurements are calculated.
10. Bolt sign to post; insure proper hardware are utilize, lock washer and nut or lock nut on back side of sign, nylon and metal washer on sign face; holding bolt head to sign face, tighten nut from backside. nuts shall be tightened sufficiently so that the sign is held firmly against the post. Caution should be used not to twist sign sheeting.
11. Install date sticker on back lower corner closest to the road.
12. Install Post in anchor with corner bolts
13. Step back and review installation . Ensure no obstructions and that sign is correctly installed
14. Collect tools and all materials and ensure worksite is free of debris
15. Remove safety devices

Move to next sign location

Special Considerations

Crew should be provided with a packet of Standard Drawings applicable to sign operations.
If drilling holes, drill from front of sign to reduce sheeting tear.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	7 - 11 Signs	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Paint Centerline	CODE	8300

Purpose

Restore visibility, retro reflectivity, and maintain traffic control by painting the centerline and lane markings on the roadway surface

For this activity a centerline includes:

1. All Yellow Lines
2. White lines separating traffic traveling in the same direction, except for right turn lanes

Category Roadway/Drainage

- ☒ **PM**
- ☒ **QA**
- ☒ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

Schedule this work during the warmer moths with emphasis place on coordination with resurfacing and seal coating operations.

Schedule the centerline painting of durable markings based on a 3 to 5 year life, contingent on retroreflectivity.

Temperature limitation for painting must be observed per paint manufacturer guidelines. Waterborne paints must be applied at 50 degree ambient temperature or higher.

All markings shall conform to the standards in the Indiana Manual on Uniform Traffic Control Devices.

Consider weather forecast for chance of rain when scheduling paint crew.

Reporting | **Reporting Units** Paint Miles

Accomplishment in the number of painted miles.

Painted Mile – total linear feet painted divided by 5280

Work done for control points shall be part of the paint card.

Crew Size 3 Workers

	QTY
Crew Leader	1
Laborer	2

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Centerliner

*Traffic Control Equipment is NOT shown here

P.P.E.

Base PPE

Materials

Paint 909.05

Glass Beads 921.02

Other References

INDOT Operations Memorandums 10-05

IMUTCD Chapter 3B

Standards and Specs 808.01

Sub Activities

Average Daily Production	24 - 50 Paint Miles	EFFECTIVE DATE	July 1, 2016

ACTIVITY	Paint Centerline	CODE	8300

Work Method

1. Set up control points if needed.
2. Visual inspection of paint guns, filters, air compressor, paint and bead lines; looking for obvious signs of leeks, clogged paint or bead shrouds, loose connections, worn hoses, etc.
3. Load truck with materials. Inspect the paint to be loaded to ensure it looks uniform and does not need to be stirred.
4. Optional: Perform wet film thickness tests – Paint over a flat surface (old sheet sign material works well) without using beads, but with the same vehicle speed and pressure planned to be used for the operation. Use wet film thickness gauge to check depth of wet paint on the flat surface. Record results on paint application form. Desired thickness is 15 mils.
5. Mobilize to job site.
6. Set up safety devices if needed and prep truck for painting operation
7. Within the first 4 miles of painting (8 miles if step 3 performed), pull off roadway on area of level ground to measure paint levels and calculate application rates. Record results on paint application form. Also inspect quality of line (width, thickness, bead coverage, bead embedment).
8. Make adjustments as necessary.
9. Resume painting operations continually listening to and watching the paint and bead guns. Pay close attention to the sound the paint gun is making. If there is a whistling noise, or the sound changes that is likely and indication something is amiss. If you here these noises or if gunners / back up drivers notice uneven coverage of paint / beads pull over as soon as possible to correct situation.
10. Flush paint guns as frequently as possible. Driver can alert gunner of upcoming intersections and roll through them to give time to flush the guns.
11. At the end of daily painting operations, flush all paint guns thoroughly to prevent paint hardening overnight. This will prevent time consuming cleaning before starting the next painting day.
12. Attach the paint application form to work order in WMS.

ACTIVITY	Paint Centerline	CODE	8300

Special Considerations

Lunch break is a good opportunity to re-fill the truck

Monitor paint build up on and around paint guns and shrouds

Consider night painting in high volume urban areas

Consider pulling over to let traffic through if it starts backing up or if a large vehicle is blocking signs.

Application Rate Guidance:

Application rates that fall between 15.5 gpm and 17.5 gpm; no mandated changes required.

Application rates of <15.5 to 14.5 gpm and > 17.5 to 18.5 gpm; adjustments shall be made to correct application rate

Application rates of <14.5 or >18.5 gpm; adjustments shall be made; in addition crew is required to measure tanks and calculate application rates again after 2 painted miles. This procedure will be repeated until acceptable application rates are achieved.

After application rates are achieved, the above procedure shall be performed every 4 hours to insure application rates are constant; this can be done when cleaning shrouds, breaking for lunch or when re-filling throughout the day.

Application rates can be adjusted with air pressure to the guns.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	24 - 50 Paint Mile	EFFECTIVE DATE	July 1, 2016

INDIANA DEPARTMENT OF TRANSPORTATION

Activity 8300/8320 Centerline and Edgeline
Paint Quality Assurance Evaluation

District: _____ **Paint Color:** _____ **Line Type:** _____ **Date:** _____

Route: _____ **Start RP** _____ **End RP** _____

Date Line Painted: _____ **Evaluated by:** _____

WO# _____ **Final Score** #DIV/0!

QA Time: Initial = 7-30 Days; Follow Up = None

OBSERVATIONS

1. **APPEARANCE** **Total Appearance Score:** **#DIV/0!**

A. Width

0 deviation from standard <-1/4" or >+1/2"
5 deviation from standard (-1/8" to -1/4") or (+3/8" to +1/2")
10 deviation from standard (>-1/8" to <0) or (>+1/4" to <+3/8)
15 deviation from standard 0 to +1/4"

Average Measurement: #DIV/0!
Points Awarded: #DIV/0!

B. Thickness

2 too thin with pavement showing through line
4 uneven thickness
6 thick or thin with even coverage
10 even thickness at standard

Average Points: #DIV/0!

C. Placement (deviation from standard)

X Transverse
4 X>1"
6 3/4"<X<or=1"
8 1/2"<X<or=3/4"
10 X<or=1/2"

Average Measurement: #DIV/0!
Points Awarded: #DIV/0!

Y Longitudinal
4 Y>12"
6 8"<Y<or=12"
8 4"<Y<or=8"
10 Y<or=4"

Average Measurement: #DIV/0!
Points Awarded: #DIV/0!

L Length
4 L<9' or L>11'
6 9'≤L<9.33' or 10.67'<L≤11'
8 9.33'≤L<9.75' or 10.25'<L≤10.67'
10 9.75≤L≤10.25

Average Measurement: #DIV/0!
Points Awarded: #DIV/0!

*For edgelines, the placement deviation is just the transverse deviation

Placement Points Awarded: #DIV/0!

D. Crispness

1 >1/2" overspray
2 >1/4" to <or=1/2" overspray
5 <or=1/4" overspray

Average Measurement: #DIV/0!
Points Awarded: #DIV/0!

Continued 2

Activity 8300/8320 Centerline and Edgeline
Page 2

2. **BEADS** **Total Beaed Score: #DIV/0!**

A. Retention

2	<70%
5	70 to <85%
10	85 to <95%
15	95 to 100%

Average Points: #DIV/0!

B. Distribution

2	light coverage
5	pulsation longitudinally
10	variable density across width of line
15	total uniform coverage

Average Points: #DIV/0!

3. **VISIBILITY** **Total Visabiltiy Score: #DIV/0!**

Points	White Avg.	Yellow Avg.
0	Less than 175 No Application Rate Form Attached to WO	Less than 100 No Application Rate Form Attached to WO
5	175-219	100-139
10	220-249	140-174
15	250-269	175-189
20	270-299	190-219
25	300 or greater	220 or greater

Average Measurement: #DIV/0!
Points Awarded: #DIV/0!

4. **ROAD CATEGORY**

Material Condition Type

Comments:

INDIANA DEPARTMENT OF TRANSPORATION

DIVISION OF MAINTENANCE

Yellow Paint Daily Form

Activity 8300 \ 8320

The first test needs to be completed within the first 4 miles (21,120 Lft) of accomplishment, or within 8 miles (42,240 Lft) if wet film thickness is checked at start of day

Paint App Rate for 4" Lines		
Application Rate (gpm)*		**Required Changes**
Low	**High**	
< 14.5	>18.5	Make adjustments, recheck after 2 painted miles
<15.5	>17.5	Make adjustments, recheck after 4 hours
15.5	17.5	No adjustments required, recheck after 4 hours

*add 3.5 gpm to all values if doing 5" skip

Target Bead App Rate for 4" Lines			
Speed	6 lbs/gal	6.5 lbs/gal	7 lbs/gal
14 mph	560	607	653
12 mph	480	520	560
10 mph	400	433	467
8 mph	320	347	373

*Multiply all rates by 1.25 for 5" lines

	Date	Time	Speed (mph)	Gun 1 Thickness (mil)	Gun 1 Width (in)	Gun 2 Thickness (mil)	Gun 2 Width (in)	Comments
Wet Film, Restest if <13 mil or >17 mil								

Calculations			D	E = D2-D1	F	G	H = F + G	I = H2 - H1	J = I / 5280	K = E / J		
Test	**Date**	**Time**	**Total Paint Used (gal)**	**Gal From Last Test**	**Gun 1 Total Lft**	**Gun 2 Total Lft**	**Total Lft**	**Lft From Last Test**	**Mi from Last Test**	**Current Paint App Rate (gpm)**	**Lowest Bead Rate (mL/ 5 sec)**	**Changes Made / Comments**
1												
2												
3												
4												
5												
6												
7												
8												
9												

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Paint Edgelines	CODE	8320

Purpose

Restore visibility, retro reflectivity, and maintain traffic control by painting the edgelines of the roadway as needed per OM 10-05.

For this activity, an edgeline is all longitudinal roadway markings along the right edge of the roadway.

Category Roadway/Drainage

- ☒ **PM**
- ☒ **QA**
- ☒ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

Schedule this work during the warmer moths with emphasis place on coordination with resurfacing and seal coating operations.

Schedule the centerline painting of durable markings based on a 3 to 5 year life, contingent on retroreflectivity.

Temperature limitation for painting must be observed per paint manufacturer guidelines. Waterborne paints must be applied at 50 degree ambient temperature or higher.

All markings shall conform to the standards in the Indiana Manual on Uniform Traffic Control Devices.

Consider weather forecast for chance of rain when scheduling paint crew.

Reporting | **Reporting Units** Paint Miles

Accomplishment in the number of painted miles.

Painted Mile – total linear feet painted divided by 5280

Work done for control points shall be part of the paint card.

Crew Size **3 Workers**

	QTY
Crew Leader	1
Laborer	1

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Centerliner

*Traffic Control Equipment is NOT shown here

P.P.E.

Base PPE

Materials

Paint 909.05

Glass Beads 921.02

Other References

INDOT Operations Memorandums 10-05

IMUTCD Chapter 3B

Standards and Specs 808.01

Sub Activities

Average Daily Production	24 - 50 Paint Miles	EFFECTIVE DATE	July 1, 2016

WORK PERFORMANCE STANDARD

ACTIVITY	Paint Edgeline	CODE	8320

Work Method

1. Set up control points if needed.
2. Visual inspection of paint guns, filters, air compressor, paint and bead lines; looking for obvious signs of leeks, clogged paint or bead shrouds, loose connections, worn hoses, etc.
3. Load truck with materials. Inspect the paint to be loaded to ensure it looks uniform and does not need to be stirred.
4. Optional: Perform wet film thickness tests – Paint over a flat surface (old sheet sign material works well) without using beads, but with the same vehicle speed and pressure planned to be used for the operation. Use wet film thickness gauge to check depth of wet paint on the flat surface. Record results on paint application form. Desired thickness is 15 mils.
5. Mobilize to job site.
6. Set up safety devices if needed and prep truck for painting operation
7. Within the first 4 miles of painting (8 miles if step 3 performed), pull off roadway on area of level ground to measure paint levels and calculate application rates. Record results on paint application form. Also inspect quality of line (width, thickness, bead coverage, bead embedment).
8. Make adjustments as necessary.
9. Resume painting operations continually listening to and watching the paint and bead guns. Pay close attention to the sound the paint gun is making. If there is a whistling noise, or the sound changes that is likely and indication something is amiss. If you here these noises or if gunners / back up drivers notice uneven coverage of paint / beads pull over as soon as possible to correct situation.
10. Flush paint guns as frequently as possible. Driver can alert gunner of upcoming intersections and roll through them to give time to flush the guns.
11. At the end of daily painting operations, flush all paint guns thoroughly to prevent paint hardening overnight. This will prevent time consuming cleaning before starting the next painting day.
12. Attach the paint application form to work order in WMS.

ACTIVITY	Paint Centerline	CODE	8300

Special Considerations

Lunch break is a good opportunity to re-fill the truck

Monitor paint build up on and around paint guns and shrouds

Consider night painting in high volume urban areas

Consider pulling over to let traffic through if it starts backing up or if a large vehicle is blocking signs.

Application Rate Guidance:

Application rates that fall between 15.5 gpm and 17.5 gpm; no mandated changes required.

Application rates of <15.5 to 14.5 gpm and > 17.5 to 18.5 gpm; adjustments shall be made to correct application rate

Application rates of <14.5 or >18.5 gpm; adjustments shall be made; in addition crew is required to measure tanks and calculate application rates again after 2 painted miles. This procedure will be repeated until acceptable application rates are achieved.

After application rates are achieved, the above procedure shall be performed every 4 hours to insure application rates are constant; this can be done when cleaning shrouds, breaking for lunch or when re-filling throughout the day.

Application rates can be adjusted with air pressure to the guns.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	24 - 50 Paint Mile	EFFECTIVE DATE	July 1, 2016

INDIANA DEPARTMENT OF TRANSPORATION

DIVISION OF MAINTENANCE

White Paint Daily Form

Activity 8300 \ 8320

The first test needs to be completed within the first 4 miles (21,120 Lft) of accomplishment, or within 8 miles (42,240 Lft) if wet film thickness is checked at start of day

Paint App Rate for 4" Lines		
Application Rate (gpm)*		**Required Changes**
Low	**High**	
< 14.5	>18.5	Make adjustments, recheck after 2 painted miles
<15.5	>17.5	Make adjustments, recheck after 4 hours
15.5	17.5	No adjustments required, recheck after 4 hours

*add 3.5 gpm to all values if doing 5" skip

Target Bead App Rate for 4" Lines			
Speed	6 lbs/gal	6.5 lbs/gal	7 lbs/gal
14 mph	560	607	653
12 mph	480	520	560
10 mph	400	433	467
8 mph	320	347	373

*Multiply all rates by 1.25 for 5" lines

	Date	Time	Speed (mph)	Gun 1 Thickness (mil)	Gun 1 Width (in)	Gun 2 Thickness (mil)	Gun 2 Width (in)	Comments
Wet Film, Restest if <13 mil or >17 mil								

Calculations			D	E = D2-D1	F	G	H = F + G	I = H2 - H1	J = I / 5280	K = E / J		
Test	**Date**	**Time**	**Total Paint Used (gal)**	**Gal From Last Test**	**Gun 1 Total Lft**	**Gun 2 Total Lft**	**Total Lft**	**Lft From Last Test**	**Mi from Last Test**	**Current Paint App Rate (gpm)**	**Lowest Bead Rate (mL/ 5 sec)**	**Changes Made / Comments**
1												
2												
3												
4												
5												
6												
7												
8												
9												

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	Ramp or Parking Lot Painting	CODE	8340

Purpose

To restore and maintain adequate traffic control by painting the ramp edgelines or parking lot roadway surface. Parking lots to be included in this activity are INDOT Facility lots, Rest Areas, and Weigh Stations.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule this work during the warmer months with emphasis on coordination with resurfacing operations.

Schedule the painting of durable markings as necessary

Seasonal and temperature limitations for painting must be observed per paint manufacturer guidelines.

Reporting | **Reporting Units** Paint Miles

Special Markings in the lots that are not standard 4" lines, such as stop bars, turn arrows, etc. should be reported to 8360 Special Marking Maintenance

Accomplishment is the number of painted miles.

Painted Mile - the total linear feet painted divided by 5280

Report ramp painting to Subactivity 360, Ramp Painting.

Report parking lot striping to Subacivity 361, Parking Lot Painting

Crew Size 2 - 3 Workers

	QTY
Crew Leader	1
Laborer	1 - 2

*Traffic Control Personnel are NOT shown here

P.P.E.

Base PPE

Materials

Paint 909.05

Beads 921.02

Thermoplastic 921.02

Job Specific Equipment

Centerliner / Edgeliner

Portable Paint Machine

Thermoplastic Melter

Thermoplastic Applicator

*Traffic Control Equipment is NOT shown here

Other References

INDOT Operations Memorandums

IMUTCD Chapter 3B

Standards and Specs 808.07

Sub Activities

360 - Ramp Painting

361 - Parking Lot Painting

Average Daily Production	5 - 15 Paint Miles	EFFECTIVE DATE	July 1, 2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

PERFORMANCE STANDARD

ACTIVITY	Ramp or Parking Lot Painting	CODE	8340

Work Method

Using Paint Truck:

1. Visual inspections of paint guns, paint filters, air compressor.
2. Load truck with materials. This can also be performed at the end of the day.
3. Mobilize to job site.
4. Pull off of road, set up safety devices, prep truck for painting.
5. Paint approximately 1 mile, pull off road to check quality of line (width, thickness, and bead coverage)
6. Begin paint operations.
7. Backup drivers should be observing line and notify crew leader of any problems or concerns. (This includes traffic back ups or line quality issues)
8. At the end of painting operations, flush all paint lines and guns as needed.
9. Return to load site.

Using Portable Paint Machine:

1. Visually inspect portable paint machine; look for obvious signs of wear or leaks.
2. Load material into paint machines at yard; insure to load enough extra paint and beads to complete project.
3. Set up any required safety devices.
4. Sweep or use blower to clan area of debris.
5. Layout stencils or line off areas to be painted.
6. Test application rate using a wet film gage. The ideal thickness is 15 mil. When using the gage, do not apply beads.
7. Paint the markings.
8. Remove any safety devices

Melted Thermoplastics:

1. Visually inspect thermoplastic melter and applicator when used; looking for obvious signs of wear or leaks.
2. Load materials; insure enough material is on trailer or truck to complete days work.
3. Light melting pot and begin melting material while in route to jobsite.
4. Mobilize to jobsite.
5. Set up safety devices.
6. Prep equipment; set up portable applicator pot with appropriate applicator “shoes”; continue to melt the appropriate amount of material in melting pot. Material should be heated to a minimum of 385 and maximum of 450 degrees Fahrenheit.
7. Remove markings if necessary with grinder, and clean marking area with broom or blower to remove excess loose material.
8. Layout markings with stencils or line markings
9. Begin marking operations; insure all safety procedures are followed to insure accidental splashing does not occur. Do not drop blocks or bags of material into melting pot. Use material chutes, and let material slide into pot. Thermoplastic should be applied at 125 mil. Beads should be applied with bead bar located directly behind the application shoe. The beads are gravity applied. Throwing beads onto melted thermoplastic after the machine is finished is ineffective. The beads need to be applied as the thermoplastic hits the roadway, otherwise the beads will not achieve proper embedment depth.
10. At the end of the operation, ensure all thermoplastic shoes are emptied and cleaned.
11. Remove safety devices.

Special Considerations

Keep close eye on paint build up around paint guns and shrouds
Consider night painting in high volume urban areas
Consider weather forecast for chance of rain when scheduling paint crew

APPROVED BY

Director, Highway Maintenance

Average Daily Production	5 - 15 Paint Miles	EFFECTIVE DATE	July 1, 2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Curb Painting	CODE	8350

Purpose

To restore and maintain adequate visibility of curbs in communities, on ramps, and at rest parks.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule this work during the warmer months.

Schedule this painting as lines deteriorate or Engineering judgement. Typically not every year.

Seasonal and temperature limitations for painting must be observed per paint manufacturer guidelines. Waterborne paints must be applied at 50 degrees ambiant temperature or higher.

All markings shall conform to the standards in the Manual on Uniform Traffic Control Devices.

Consider weather forcast for chance of rain when scheduling paint crews

Reporting

Reporting Units Linear Feet

Accomplishment is the feet of painted curb.

When painting top and side of curb on separate passes, it is still only 1 accomplishment per foot of curb.

Crew Size — 2 Workers

	QTY
Crew Leader	1
Laborer	1

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Centerliner / Edgeliner

*Traffic Control Equipment is NOT shown here

P.P.E.

Base PPE

Materials

Paint 909.05

Glass Beads 921.02

Other References

INDOT Operations Memorandums

IMUTCD Chapter 3B

Standards and Specs 808.06

Sub Activities

Average Daily Production	5,000 Linear Feet	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Curb Painting	CODE	8350

Work Method

1. Visual inspections of paint guns, paint filters, air compressor, paint and bead lines; looking for obvious signs of leaks, clogged paint or bead shrouds, loose connections, or worn hoses.
2. Load truck with materials. This can also be performed at the end of the day.
3. Mobilize to job site.
4. Pull off of road, set up safety devices, prep truck for curb painting; lower carriage to prescribed height determined by the specific curb to be painted. Place safety chains or connect steel bars to carriage to prevent it from accidently falling or moving during this operation. This will prevent damage to the carriage itself and the paint and bead guns. Position paint and bead guns to paint the desired curbs.
5. Begin paint operations. Drive slowly approximately 5 MPH or less to prevent damage to paint guns. Application rates should be the same as 4" painted lines; 16.5 gallons of paint per painted mile and 6 pounds of glass beads per gallon of paint.
6. Backup drivers should be observing painted curb and notify crew leader of any problems or concerns. (This includes traffic back ups or line quality issues)
7. At the end of painting operations, flush all paint guns as needed.
8. Return to load site.

Special Considerations

Keep close eye on paint build up around paint guns and shrouds.
Consider night painting in high volume urban areas.
Consider coordinating painting with special events in the communities.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	5,000 Linear Ft	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Special Marking Maintenance	CODE	8360

Purpose

Maintain visibility and retrorefectivity of existing arrows, crosswalks, stop bars, railroad markings, gore areas, cross hatching, etc. with paint, thermoplastics, or other cold plastics.

This activity includes removal of unnecessary special markings.

Category Roadway/Drainage

- ☒ **PM**
- ☒ **QA**
- ☒ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule during warm months when possible, but this work can be performed throughout the year. Emphasis should be placed on coordination with new construction, seal coating, resurfacing and centerline / edgeline painting operations.

Seasonal and temperature limitations must be observed for the marking material used. All markings should conform to the Manual on Uniform Traffic Control Devices.

Reporting — **Reporting Units** Square Feet

Accomplishment is reported as square footage of marking material placed. See table below for estimates.

Unless no new marking is installed, removal of markings is not an accomplishment.

New special markings installed at new locations are reported to activity 8400

Painting of INDOT facility parking lots, including rest parks and weigh stations, should be reported to Activity 8340.

Square Footage Table

4" Material = 0.33 sq ft	Straight Arrow = 12.5 sq ft	Any Letter = 6.0 sq ft
6" Material = 0.50 sq ft	Left and Right Arrow = 15.5 sq ft	2 Letters = 12.0 sq ft
8" Material = 0.67 sq ft	Combo Arrow = 28.0 sq ft	3 Letters = 18.0 sq ft
12" Material = 1.0 sq ft	R X R = 69.0 sq ft	4 Letters = 24.0 sq ft
16" Material = 1.33 sq ft	39" Handicap Symbol = 3.3 sq ft	5 Letters = 30.0 sq ft
24" Material = 2.0 sq ft	48" Handicap Symbol = 4.3 sq ft	6 Letters = 36.0 sq ft
42" Color Handicap = 12.0 sq ft		

Report to the appropriate subactivity for the specific material used.

Crew Size — **2 - 3 Workers**

	QTY
Crew Leader	1
Laborer	1 - 2

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Thermoplastic Applicator
Thermoplactic Melter
Portable Paint Machine
Portable Line Remover
*Traffic Control Equipment is NOT shown here

P.P.E.

Base PPE

Materials

Thermoplastic (921.02) Cold Plastic (921.02)
Waterborne Paint (909.05) Glass Beads (921.02)

Other References

IMUTCD Chapter 3B
Attached area estimates
Material Safety Data Sheet for each material (received with shipment of materials)
Standards and Spec 808.01

Sub Activities

357 - Thermoplastic 359 - Preformed Plastic 358 - Waterborne Paint

Average Daily Production	600 – 1,200 Square Ft	EFFECTIVE DATE	July 1, 2014

ACTIVITY	Special Marking Maintenance	CODE	8360

Work Method

Work methods vary depending on material used.

Melted thermoplastics:

1. Visually inspect thermoplastic melter and applicator when used; looking for obvious signs of wear or leaks.
2. Load materials; ensure enough material is on trailer or truck to complete days work.
3. When using thermoplastic, light melting pot and begin melting material while in route to jobsite.
4. Mobilize to job site.
5. Set up safety devices.
6. Prep equipment; set up portable applicator pot with appropriate applicator "shoes"; continue to melt the proper amount of material in melting pot. Material should be heated to a minimum of 385 and maximum of 450 degrees.
7. Remove markings if necessary with grinder. Clean marking area with broom or blower removing loose material.
8. Layout markings with stensils or line markings
9. Begin marking operations; insure all safety procedures are followed to insure accidental spashing does not occur,do not drop blocks or bags of material into melting pot; use material chutes and let material slide into pot, thermoplastic should be applied at 125 mil. Beads should be applied with bead bar located directly behind the application shoe. The beads are gravity applied. Throwing beads onto melted thurmoplastic after the machine is finished is ineffective. The beads need to be applied as the material is applied to the roadway; a crust forms almost immediately and this prevents beads from being embedded to proper depth when thrown on afterwords.
10. At the end of marking operations, ensure all thermoplastic shoes are emptied and clean.
11. Remove safety devices

Pre-formed thermoplastic:

1. Check propane torches prior to leaving yard; torches should be rated at 750 degrees in order to effectively melt the pre-formed plastic. Always carry extra propane tanks. Load enough material to perform scheduled work.
2. Mobilize to job site; set up safety devices
3. Sweep or use blower to clean area of debris
4. Mark roadway, if necessary, and lay out pre-formed markings.
5. Heat markings uniformly until plastic is fully melted and adhears to the pavement. Typically a small amount of bubbling will occur and the plastic will change colors slightly.
6. Remove safety devices.

Cold applied tape:

1. Load material; mobilize to job site.
2. Sweep or use blower to clean area of debris
3. Mark roadway, if necessary, apply activator (glue) to area and let it set up; apply tape and roll it with weighted roller per manufactures specification.
4. Remove safety devices.

ACTIVITY	Special Marking Maintenance - Cont'd	CODE	8360

Waterborne paint:

1. Visually inspect protable paint machine; look for obvious signs of wear or leaks.
2. Load material into paint machines at yard; insure to load enough extra paint and beads to complete project.
3. Sweep or use blower to clean area of debris
4. Layout stensils or line off areas to be painted;
5. Paint markings; application rate is as close to the painted mile rates as possible using the portable machine. A wet film gage can be used to measure line thickness. Ideal thickness is 15 mil. When using this gage do not apply beads; this test should be used prior to markings application.
6. Remove safety devices

Special Considerations

Try to perform activity in warm months to allow use of block or bag thermoplastics or waterborne paint. Higher productivity rates can be achieved with these particular markings.

Pre-formed markings can be used in colder weather, but are more expensive and much less productivity can be expected.

When melting pot is on, consider having one crew member monitor pot at all times for safety.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	600 – 1,200 Square Ft	EFFECTIVE DATE	July 1, 2014

INDIANA DEPARTMENT OF TRANSPORTATION (INDOT)

Activity 8360 - Special Markings Quality Assurance Evaluation

District/ Sub district: _____ **Evaluation Date:** _____

Intersection: _____ **Route:** _____ **RP Start:** _____ **End:** _____

Date Project completed: _____ **Evaluated by:** _____

WO# _____

QA Type: Initial = 7-30 Days; Follow Up = None **Score:** ☐

OBSERVATIONS: **2 per type per site** **(No rest parks, or other institutions)**

Special Markings Types:

1 Arrows	☐	**3 Only's**	☐	**5 Crosswalk**	☐
2 Stop Bars	☐	**4 RxR**	☐	**6 School**	☐

1 Placement

0 Not proper placement
10 Placed according to specifications

Type Points ☐☐☐☐☐☐ **Avg**

2 Size of Marking

0 Size is not correct according to spec
20 Correct size according to marking type & spec

Type Points ☐☐☐☐☐☐ **Avg**

3 Retro-reflectivity

0 <250 value
20 Range from 250 to 299 value
30 ≥300 value

Type Points ☐☐☐☐☐☐ **Avg**

4 Crispness

1 >1/2" overspray
2 > 1/4" to < or= 1/2" overspray
5 <or= 1/4" overspray

Type Points ☐☐☐☐☐☐ **Avg**

5 Adherance to Pavement

0 Any part not adhearing to road
20 Material 100% adhearing to road

Type Points ☐☐☐☐☐☐ **Avg**

Activity 8360 - Special Markings Quality Assurance Evaluation

continue

Road Type: _____

Pavement Type: _____

Road Condition: _____

ADT: _____

SPEED: _____

Comments about Special Markings QA:

TOTAL POINTS:

Observation #		1	2	3	4	5
Available Points	85	10	20	30	5	20
Actual Points	0					

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Inspect/Replace Reflector	CODE	8390

Purpose

To restore and maintain adequate traffic control, inspect or replace missing or damaged reflectors on barrier walls and/or guardrail.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule this work throughout the year as needed. Seasonal and temperature limitations for adhesive must be observed. All work shall conform to the Manual on Uniform Traffic Control Devices and the INDOT Standards Sheets

Reporting | **Reporting Units** Reflectors

Accomplishment is number of new reflectors placed. Removal of markings is not an accomplishment.

Report RPM work to 2560 only.

Report Delineator to 8140 only.

Crew Size 2 Workers

	QTY
Laborers	2

*Traffic Control Personnel are NOT shown here

P.P.E.

Base PPE

Materials

Special Reflectors 926.02

Job Specific Equipment

*Traffic Control Equipment is NOT shown here

Other References

INDOT Standards and Specs 808.11

Sub Activities

Average Daily Production	50 - 100 Reflectors	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Inspect/Replace Reflector	CODE	8390

Work Method

1. Place safety devices
2. Replace reflectors
3. Clean up work areas
4. Remove safety devices

Special Considerations

APPROVED BY	
Director, Highway Maintenance	

Average Daily Production	50 - 100 Reflectors	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	New Special Marking Installation	CODE	8400

Purpose

This activity includes installation of new markings in new locations, traffic islands, channelization through intersections, and new pavement messages to help direct traffic. (Adding new markings to the markings field inventory)

Category Roadway/Drainage

- ☐ PM
- ☒ QA
- ☐ Unit Cost
- ☐ Plan Location

Scheduling & Coordination

Traffic Engineering will provide locations for new special markings.

Schedule during warm months when possible, but this work can be performed throughout the year. Emphasis should be placed on coordination with new construction, seal coating, resurfacing and centerline / edgeline painting operations.

Seasonal and temperature limitations must be observed for the marking material used. Melted Thurmoplastic shall be applied when pavement temperatures are at 40 degrees or higher; Pre-formed Thurmoplastic can be applied at temperatures of 20 degrees as long as pavement has been heated to the point all moisture is removed. Waterborne paint can be applied at ambient temperatures of 50 degrees or higher; Cold applied tape can be applied at 50 degrees or higher. All markings should conform to the Manual on Uniform Traffic Control Devices.

Reporting

Reporting Units Square Feet

Existing special marking maintenance should be reported to activity 8360

Accomplishment is reported as square footage of marking material placed. Use table below for area estimates.

Removal of existing markings is not an accomplishment.

Square Footage Table

4" Material = 0.33 sq ft	Straight Arrow = 12.5 sq ft	Any Letter = 6.0 sq ft
6" Material = 0.50 sq ft	Left and Right Arrow = 15.5 sq ft	2 Letters = 12.0 sq ft
8" Material = 0.67 sq ft	Combo Arrow = 28.0 sq ft	3 Letters = 18.0 sq ft
12" Material = 1.0 sq ft	R X R = 69.0 sq ft	4 Letters = 24.0 sq ft
16" Material = 1.33 sq ft	39" Handicap Symbol = 3.3 sq ft	5 Letters = 30.0 sq ft
24" Material = 2.0 sq ft	48" Handicap Symbol = 4.3 sq ft	6 Letters = 36.0 sq ft
42" Color Handicap = 12.0 sq ft		

Crew Size 2 - 3 Workers

	QTY
Crew Leader	1
Laborer	1 - 2

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Thermoplastic Applicator
Thermoplactic Melter
Portable Paint Machine
Portable Line Remover
*Traffic Control Equipment is NOT shown here

P.P.E.

Base PPE

Materials

Thermoplastic (921.02) Cold Plastic (921.02)
Waterborne Paint (909.05) Glass Beads (921.02)

Other References

IMUTCD Chapter 3B Standard/Spec 808.01
Attached area estimates
Material Safety Data Sheet (received with materials)

Sub Activities

Average Daily Production	300 - 600 Square Ft	EFFECTIVE DATE	July 1, 2013

ACTIVITY	New Special Marking Installation	CODE	8400

Work Method

Work methods vary depending on material used.

Melted thermoplastics:

1. Visually inspect thermoplastic melter and applicator when used; looking for obvious signs of wear or leaks.
2. Load materials; ensure enough material is on trailer or truck to complete days work.
3. When using thermoplastic, light melting pot and begin melting material while in route to jobsite.
4. Mobilize to job site.
5. Set up safety devices.
6. Prep equipment; set up portable applicator pot with appropriate applicator "shoes"; continue to melt the proper amount of material in melting pot. Material should be heated to a minimum of 385 and maximum of 450 degrees.
7. Remove markings if necessary with grinder. Clean marking area with broom or blower removing loose material.
8. Layout markings with stensils or line markings
9. Begin marking operations; insure all safety procedures are followed to insure accidental spashing does not occur,do not drop blocks or bags of material into melting pot; use material chutes and let material slide into pot, thermoplastic should be applied at 125 mil. Beads should be applied with bead bar located directly behind the application shoe. The beads are gravity applied. Throwing beads onto melted thurmoplastic after the machine is finished is ineffective. The beads need to be applied as the material is applied to the roadway; a crust forms almost immediately and this prevents beads from being embedded to proper depth when thrown on afterwords.
10. At the end of marking operations, ensure all thermoplastic shoes are emptied and clean.
11. Remove safety devices

Pre-formed thermoplastic:

1. Check propane torches prior to leaving yard; torches should be rated at 750 degrees in order to effectively melt the pre-formed plastic. Always carry extra propane tanks. Load enough material to perform scheduled work.
2. Mobilize to job site; set up safety devices
3. Sweep or use blower to clean area of debris
4. Mark roadway, if necessary, and lay out pre-formed markings.
5. Heat markings uniformly until plastic is fully melted and adhears to the pavement. Typically a small amount of bubbling will occur and the plastic will change colors slightly.
6. Remove safety devices.

Cold applied tape:

1. Load material; mobilize to job site.
2. Sweep or use blower to clean area of debris
3. Mark roadway, if necessary, apply activator (glue) to area and let it set up; apply tape and roll it with weighted roller per manufactures specification.
4. Remove safety devices.

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	New Special Marking Installation	CODE	8400

Waterborne paint:

1. Visually inspect protable paint machine; look for obvious signs of wear or leaks.
2. Load material into paint machines at yard; insure to load enough extra paint and beads to complete project.
3. Sweep or use blower to clean area of debris
4. Layout stensils or line off areas to be painted;
5. Paint markings; application rate is as close to the painted mile rates as possible using the portable machine. A wet film gage can be used to measure line thickness. Ideal thickness is 15 mil. When using this gage do not apply beads; this test should be used prior to markings application.
6. Remove safety devices

Special Considerations

If there is not a full day of work, consider scheduling with Activity 8360 in the same area.

Try to preform activity in warm months to allow use of block or bag thermoplastics or waterborne paints. Higher productivity rates can be achieved with these particular markings.

Preformed markings can be used in colder weather, but are more expensive and musch less productivity can be expected.

When melting pot is on, consider having one crew member monitor pot at all times for safety.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	300 - 600 Square Ft	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Signal Maintenance Response	CODE	8500

Purpose

Respond to a malfunctioning signal to restore it to an acceptable operating mode, conduct repairs and replacement of traffic signals, flashing beacons, and pre-warning flashers to include wiring, detection, controllers, controller programming changes, setting clocks, and any other changes to control devices.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

This can be scheduled year round.

Conduct this activity as required, it is not routinely scheduled

Reporting

Reporting Units Comm. Nos.

An accomplishment is reported for each commission number serviced.

There are two sub activities

1. Accident Damage - issue caused by vehicle accident
2. Storm Damage - issue caused by weather

Crew Size 1 Workers

	QTY
Electrican Tech 2	1

Job Specific Equipment

Signal Van	1

P.P.E.

Base PPE

Materials

Determined by specific work to be performed.

Other References

Equipment Manuals - should be in cabinets

Timing Sheet in cabinet

IMUTCD Chapter 4B

Standard Drawings

INDOT Standards and Specs Section 805

Sub Activities

300 Accident Damage

350 Storm Damage

Average Daily Production	3 - 5 Comm. No.	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Signal Maintenance Response	CODE	8500

Work Method

1. Confirm response to dispatcher
2. Set up traffic control and signs if neccessary
3. Determine extent of malfunction
4. Secure intersection
5. Complete necessary adjustments or repairs
6. Document repairs on cabinet card
7. Observe function of facility to insure acceptable operating mode
8. Remove any temporary traffic controls
9. Report signal back in operation
10. Update cabinet maintenance card

Special Considerations

Knowing time of malfunction before going out to signal can help if there is a timing issue in a signal with multiply timings.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	3 - 5 Comm. No.	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Signal Preventive Maintenance	CODE	8510

Purpose

To keep equipment fully operational, reliable, and safe by scheduling routine inspections and repair/replacing deficient equipment such as controllers, amplifiers, relays, loops, wiring, interconnects, and electrical components.

Category Roadway/Drainage

- ☒ **PM**
- ☒ **QA**
- ☒ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule work throughout the year.

Each comm. Number should have 1 – 2 scheduled visits per year

The following must be done on at least once per year

1. Conflict Monitor (MMU) changed out
2. Perform a detection loop test
3. If signal has railroad preemption, a co-inspection with a railroad representative to ensure functionality

Reporting | **Reporting Units** Comm. Nos.

An accomplishment is reported in the number of commission numbers serviced.

Performing a routine maintenance, testing loops, and replacing MMU for a commission number is 1 accomplishment.

Crew Size 1 Workers

	QTY
Electrical Tech 2	1

P.P.E.

Base PPE

Materials

Job Specific Equipment

Signal Van	1

Other References

Equipment Manuals - should be in cabinets

Timing Sheet in cabinet

IMUTCD - Chapter 4

Standard Drawings

Signal PM Procedure

INDOT Standards and Specs Section 805

Sub Activities

Average Daily Production	3 - 5 Comm. No.	EFFECTIVE DATE	7/1/2016

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Signal Preventive Maintenance	CODE	8510

Work Method

Contact railroad representative to set up a date if railroad preemption testing is needed.

1. Follow through Traffic Signal PM Checklist.
2. Complete the necessary replacements, adjustments, or repairs.
3. Replace conflict monitor (MMU), if necessary (once per year).
4. Test Loops with inductive loop analyzer, if necessary (once per year).
5. Observe function of unit to insure proper operation.
6. Update cabinet maintenance card.

Special Considerations

Replacing MMU will put signal into flash, so consider time of day and weather conditions when shutting signal down for MMU replacement.

Railroads should be inspecting their intersections once a month.

		APPROVED BY	
		Director, Highway Maintenance	
Average Daily Production	3 - 5 Comm. No.	EFFECTIVE DATE	7/1/2016

INDIANA DEPARTMENT OF TRANSPORTATION (INDOT)

Traffic Signal Maintenance QC/QA

District: **Date:**

Intersection: **Comm #**

Evaluator(s):

Final Score %

Deficiency:

1 Routine Maintenance

		Fill in with Pass or Fail
A	MMU not changed in past 12 months or not certified in past 15 months	
B	Detection and communications equipment not functionally depreciated from design	

2 Detection

		Amnt	Unit		Value	Deductions
A	Vehicle detection malfunctioning: Not documented or > 3 month	0	lanes	x	15	0
B	Vehicle detection malfunctioning: Documented and < 3 months old	0	lanes	x	10	0
C	Any pedestrian push button malfunctioning	0	ped buttons	x	10	0
D	Any phase utilizing video detection not on min recall	0	phases	x	10	0
E	Any rack or shelf mount harness mislabeled	0	amplifiers	x	10	0
F	Any rack or shelf mount harness not labeled	0	amplifiers	x	3	0
G	Any rack or shelf mount harness labeled but not with label maker	0	amplifiers	x	1	0
					Total Deductions	0
					30 Possible Points - Deductions:	**30**

3 Communications

		Amnt	Unit		Value	Deductions
A	Controller type does not match system for communication or high-res data (Installed >1 work day)	0			30	0
B	Closed Loop/Hardwire Interconnect: Master not communicating with remote secondary controllers	0	failed controller	x	5	0
C	Closed Loop/Hardwire Interconnect: Secondary controller not receiving commands from master	0			15	0
D	MMU in high-res system is not Ethernet capable or has wrong IP address	0			10	0
E	Master Controller: Clock > 5 sec off Atomic Clock time	0			10	0
F	Communication antennas and cables mounted properly	0	antennna	x	10	0
G	Isolated Signal: Clock > 10 seconds off Atomic Clock time	0			5	0
H	Time Based Coordination: Clock > 5 sec from adjacent intersections(s) time	0	secs over 5	x	2	0
					Total Deductions:	0
					30 Possible Points - Deductions:	**30**

4 Basic Controller Parameters (Timings not altered to address hardware failures)

		Amnt	Unit	Value	Deductions
A	Data restoration device for timings is missing? (Data Key, Eprom, USB etc)	0		10	0
B	Phases not engineered to be on recall are on recall (normally only 2 & 6)	0		10	0
C	Minimum Greens do not match engineered values on timing sheet	0		10	0
D	Clearance intervals (yellow and all red) don't match engineered value on timing sheet	0		10	0
E	Phases with memory or locking detector on where stop bar detection is present	0		15	0
F	Out of Flash not set to 6 seconds all-red before mainline green	0		10	0
				Total Deductions:	0
				15 Possible Points - Deductions:	**15**

5 Cabinet Documentation

		Amnt	Unit		Value	Deductions
A	Extra timing sheets in cabinet other than the current timing sheet.	0			5	0
B	Missing or extra emergency and routine maintenance cards in cabinet (Current plus one expected)	0			5	0
C	Missing, extra or inaccurate cabinet print is in cabinet	0			5	0
D	Signal wiring (detection lead in or overhead) label missing	0	wires	x	1	0
					Total Deductions:	0
					10 Possible Points - Deductions:	5

Traffic Signal Maintenance QC/QA
Page 2

6	Miscellaneous		Unit	Value	Deductions
A	Fail Flash hard-wired to flash Yellow	0		15	0
B	Non-documented/not tagged unpowered signal equipment in cabinet (examples: additional controllers,monitors, BIU,	0		10	0
C	Any indication (vehicle or pedestrian) not working	0	indications x	5	0
D	Signal heads vertically or horizontally misaligned	0	heads x	3	0
E	Broken, missing or visibly sagging span or tether wire	0	wires x	5	0
F	Obvious cabinet filter dirty, missing, not secured, etc.	0		5	0
G	Cabinet is dirty, shelves not clean, trash in bottom of cabinet	0		5	0
H	Heavy overgrowth or poison ivy makes access difficult	0		3	0
I	Any pole handhole missing or not secured to pole	0	handholes x	2	0
J	Any detector housing lid missing, not secured, or broken	0	DH's x	3	0
K	Cabinet is defaced (graffiti, posters, etc.)	0		2	0
L	No padlock on signal service	0		5	0
				Total Deductions:	**0**
				15 Possible Points - Deductions:	**15**

Judgment of Evaluator (Evaluator's Comments Required)

Observation #	1	2	3	4	5	6
Possible - Deductions*	PASS	30	30	15	5	15
Possible Points	PASS/FAIL					
			Final Score (%)**			

*cannot be a negative value

**if #1 was a failure the final score is 0%

Activity 8510 - TRAFFIC SIGNAL			
PREVENTATIVE MAINTENANCE CHECKLIST			
LOCATION		COMM. NO.	
DATE		BY	

OK	NOT OK	DATE CORRECTED	DESCRIPTION
			1. Signal Indications & Heads:
☐	☐		a. All indications lighting
☐	☐		b. Visors broken, loose, missing
☐	☐		c. Proper height?
☐	☐		d. Proper alignment - horizontal, vertical, and rotation.
☐	☐		e. No pinnacles missing.
☐	☐		f. Visibility, sight distance.
☐	☐		**2. Overhead Spans, Cables & Signs:**
☐	☐		a. Proper spacing of cable rings.
☐	☐		b. Tether broken, loose, missing
☐	☐		c. Sagging or loose spans or "A" wires?
☐	☐		d. Check to insure all signs are installed and in satisfactory condition.
☐	☐		**3. Service Disconnect Box:**
☐	☐		a. Box and conduit mounted securely?
☐	☐		b. All connections snug?
☐	☐		c. Ground wire secured to pole?
☐	☐		d. Ground rod clamp snug (if possible)
☐	☐		e. Lock on securely?
☐	☐		f. General inspection for condition missing covers, etc.
☐	☐		**4. Poles :**
☐	☐		a. Access plates missing?
☐	☐		b. Skirts missing?
☐	☐		c. General condition of poles.
☐	☐		**5. Check Condition of Detection:**
☐	☐		a. Look for conditions indicative of upcoming failures.
☐	☐		**6. Check Hand Holes -** High, low, damaged?
☐	☐		**7. Special markings:**
☐	☐		a. Condition of stop bar.
☐	☐		b. Condition of Pedestrian crossing.

Activity 8510 - TRAFFIC SIGNAL			
PREVENTATIVE MAINTENANCE CHECKLIST			
LOCATION		COMM. NO.	
DATE		BY	

OK	NOT OK	DATE CORRECTED	DESCRIPTION
☐	☐		**8. Signal Controller Cabinet:**
☐	☐		a. Mounted & sealed securely to pedestal, pole or foundation?
☐	☐		b. Check door gaskets for water tightness.
☐	☐		c. External conduit mounted securely, if present?
☐	☐		d. Check fan & convenience lamp installed and working?
☐	☐		e. Check cabinet cleanliness.
☐	☐		f. Check cabinet filter.
☐	☐		g. Connections snug?
☐	☐		h. Proper line voltage?
☐	☐		**9. Signal Equipment:**
☐	☐		a. Current timing sheet present?
☐	☐		b. Cabinet maintenace cards present?
☐	☐		c. Controller programed as per current timing sheet?
☐	☐		d. Controller Date & Time correct?
☐	☐		e. Cabinet print present & correct?
☐	☐		f. All cables & detection correctly labeled?
☐	☐		g. MMU meet certification criteria (within 15 months)
☐	☐		h. Detectors putting calls into proper phases?
☐	☐		i. Comunications working?
☐	☐		j. Preemption working? (Railroad or Emergency Vehicle)

Comments:

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Flasher Preventive Maintenance	CODE	8511

Purpose

To keep equipment full operational, reliable, and safe by scheduling routine inspections of equipment such as flasher controllers, wiring, and electrical components.

Any repairs should go on Activity 8500

Category Roadway/Drainage

- ☒ **PM**
- ☒ **QA**
- ☒ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule throughout the year.

Each comm. number should have 1 scheduled visit per year.

Reporting

Reporting Units Comm. Nos.

An accomplishment is reported in the number of commission numbers serviced.

Crew Size 1 Workers

	QTY
Electrician Tech 2	1

P.P.E.

Base PPE

Materials

Job Specific Equipment

Signal Van	1

Other References

IMUTCD - Chapter 4D

Flasher PM Procedure

Sub Activities

Average Daily Production	6 - 8 Comm. No.	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Flasher Preventive Maintenance	CODE	8511

Work Method

1. Follow through Flasher Prevenatative Maintenance Checklist.
2. Complete the necessary replacements, adjustments, or repairs.
3. Observe function of unit to insure proper operation
4. Update cabinet maintenance card.

Special Considerations

School Zone flashers will have a timed clock.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	6 - 8 Comm. No.	EFFECTIVE DATE	7/1/2013

Activity 8511 - FLASHER
PREVENTATIVE MAINTENANCE CHECKLIST

LOCATION		**COMM. NO.**	
DATE		**BY**	

OK	NOT OK	DATE CORRECTED	DESCRIPTION
			1. Indications & Heads:
			a. All indications lighting
			b. Visors broken, loose, missing
			c. Proper height?
			d. Proper alignment - horizontal, vertical, and rotation.
			e. No pinnacles missing.
			f. Visibility, sight distance.
			2. Overhead Spans & Cables:
			a. Proper spacing of cable rings.
			b. Tether broken, loose, missing
			c. Sagging or loose spans or "A" wires?
			3. Service Disconnect Box:
			a. Box and conduit mounted securely?
			b. All connections snug?
			c. Ground wire secured to pole?
			d. Ground rod clamp snug (if possible)
			e. Lock on securely?
			f. General inspection for condition missing covers, etc.
			4. Poles:
			a. Access plates missing?
			b. Skirts missing?
			c. General condition of poles.
			5. Check Hand Holes - High, low, damaged?
			6. Special Markings :
			a. Condition of stop bar.
			b. Condition of Pedestrian crossing.

Activity 8511 - FLASHER
PREVENTATIVE MAINTENANCE CHECKLIST

LOCATION		COMM. NO.	
DATE		BY	

OK	NOT OK	DATE CORRECTED	DESCRIPTION
			7. Flasher Cabinet:
			a. Mounted & sealed securely to pedestal, or pole?
			b. Check door gaskets for water tightness.
			c. External conduit mounted securely, if present?
			d. Check fan operation
			e. Check cabinet cleanliness.
			f. Connections snug?
			g. Proper line voltage?
			8. School Flasher Equipment:
			a. Current School timings sheet present?
			b. Timer programmed to match school timings
			c. Timer, Date & Time correct?
			d. All cables correctly labeled?
			e. Cabinet Maintenance cards present?

Comments:

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Signal Shop Activities	CODE	8520

Purpose

Testing, programming, refurbishing, and assembling equipment in the signal shop in preparation of field implemenation, and other related work.

Category Non-Road

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule work throughout the year or as directed by supervisor.

Reporting | **Reporting Units** Person Hours

Accomplishment is reported in person hours.

Do not report materials used on this card. Materials will be reported on the card when installed.

Crew Size 1 Workers

	QTY
Electrican Tech 2	1

P.P.E.

Base PPE

Materials

Determined by specific work performed

Job Specific Equipment

Other References

Signal as built designs

Signal timing datatbase

Sub Activities

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Signal Shop Activities	CODE	8520

Work Method

1. Repair or replace system components as determined by specific work to be performed.
2. Recertify conflict monitor (MMU)
3. Program controllers
4. Set up signal cabinet according to as builts
5. Wire signal heads

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Scheduled Signal/Flasher Indication Replacement	CODE	8530

Purpose

Prevent signal indication outages by conducting LED replacement and cleaning of signal indicators and flashing beacons to ensure that the expected life of LEDs are not exceeded according to policy. Helps ensure signal faces remain clear and bright.

Category Roadway/Drainage

- ☒ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

Schedule work throughout the year.

Schedule work according to the WMS Annual Work Plan.

LEDS replacement cycle should be per current policy (see OM 06-05).

Reporting

Reporting Units Indications

Accomplishment is the total number of LED indications replaced.

Emergency or unscheduled replacements should be reported to activity 8535.

Crew Size **2 Workers**

	QTY
Electrician Tech 2	1
Laborer	1

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Aerial Bucket/Lift Truck	1
Signal Van	1

*Traffic Control Equipment is NOT shown here

P.P.E.

1) Base PPE

2) Safety Harness/Fall Protection when using aerial lift

Materials

Bulb or LED Indications 922.04

Other References

OM 06-05

Sub Activities

Average Daily Production	30 - 50 Indications	EFFECTIVE DATE	4/1/2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Scheduled Signal/Flasher Indication Replacement	CODE	8530

Work Method

1. Place work area safety signs and devices
2. Replace LED's
3. Clean signal lenses and reflectors that will not be replaced
5. Check condition of wiring
6. Check condition of balance adjuster and visors
7. Check splices, span wire, mounting brackets to ensure everything is secured and not sagging.
8. Update cabinet maintenance card.
9. Remove work area safety signs and devices

Special Considerations

One signal tech with a ladder can replace PED lights.

Signals require three workers with an aerial bucket truck or platform lift.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	30 - 50 Indications	EFFECTIVE DATE	4/1/2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Non Scheduled Signal/Flasher Indication Replacement	CODE	8535

Purpose

Replacement of signal and flasher indications that are not functioning.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Perform this activity as outages occur

The type of light out should be considered. Red lights (if only one head) and green turn arrow should be considered for replacement on an emergency basis.

Scheduled changeouts should be reported to activity 8530.

Reporting **Reporting Units** Indications

Accomplishment is the total number of LED indications replaced.

Scheduled changedouts should reported to activity 8530

Crew Size **2 Workers**

	QTY
Electrician Tech 2	1
Laborer	1

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Aerial Bucket	1

*Traffic Control Equipment is NOT shown here

P.P.E.

1) Base PPE

2) Safety Harness/Fall Protection when using aerial lift

Materials

Bulb or LED Indications	922.04

Other References

OM 06-05

Sub Activities

Average Daily Production	1 - 3 Indications	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Non Scheduled Signal/Flasher Indication Replacement	CODE	8535

Work Method

1. Place work area safety signs and devices
2. Replace LED's
3. Clean signal lenses and reflectors that will not be replaced
5. Check condition of wiring
6. Check condition of balance adjuster and visors
7. Check splices, span wire, mounting brackets to ensure everything secured and not sagging.
8. Update cabinet maintenance card.
9. Remove work area safety signs and devices

Special Considerations

If there is a non scheduled signal replacement, but that intersection has scheduled replacements later in the same year, consider replacing all LED's at location.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	1 - 3 Indications	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Detector Loop Splice Repair or Install	CODE	8541

Purpose

Splice and repair existing vehicle detection loops including testing in the detector housing and re-splicing (sealing) the existing loops.

Install or replace vehicle detection wire at determined locations. This would include sawing, placement of wire, splicing, sealing, testing all loops affected by the new loop, and sealing of saw slot.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule work as required based on loop failures or new installations. This work can be done year round.

Reporting

Reporting Units Splices

Accomplishment: The number of splices repaired or installed.

Crew Size **2 Workers**

	QTY
Electrician Tech 2	2

*Traffic Control Personnel are NOT shown here

P.P.E.

Base PPE

Materials

Sealant	922.06
Loop Wire	922.06
Detector Loop	922.06

Job Specific Equipment

Signal Van	1
Concrete Saw	1

*Traffic Control Equipment is NOT shown here

Other References

INDOT Standard and Specs 805.09

Sub Activities

351 Install/Replace Loop

Average Daily Production	4 - 6 Splices	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Detector Loop Splice Repair or Install	CODE	8541

Work Method

1. Place signs and other safety devices
2. Visual inspection of insterection looking for failed pavement around loops or broken loops.
3. Test loops by opening conductor loop lead and using inductive loop analyzer to determine if loop is functioning.
4. Install loops if necessary
   - -Lay out loops and mark pavement for cuts if necessary
   - -Saw pavement as marked if necessary
   - - Properly clean saw slot to prepare for loop wire instalation and backer rod
   - - Install backer rod as required
5. Perform preliminary acceptance tests
6. Seal saw slot if necessary
7. Make splice to 2C/16 lead-in and sealing
8. Perform final acceptance test
9. Update cabinet maintenance card
10. Clean up
11. Remove signs and safety devices
12. Observe loops are functioning properly with traffic

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	4-6 Splices	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	New Signal or Flasher Inspection or Turn On	CODE	8550

Purpose

Inspection of new signal or flasher installation to insure compliance to plans and specification. This can include assisting with loop layouts. Report supervision of the contractor, during activation of the new or modernized traffic signal or flasher to confirm signal is properly functioning.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule as needed, in coordination with Construction activities.

Reporting | **Reporting Units** Comm. Nos.

Accomplishment: Each commission number inspected.

Crew Size 1-2 Workers

	QTY
Electrician Tech 2	1
Laborer	0 - 1

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Signal Van / Aerial Bucket Truck	1

*Traffic Control Equipment is NOT shown here

P.P.E.

Base PPE

Materials

Other References

INDOT Standard and Specs 805

Sub Activities

Average Daily Production	3 Comm. No.	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	New Signal or Flasher Inspection or Turn On	CODE	8550

Work Method

1. Respond to request for inspection from Project Engineer
2. Place signs and other safety devices (if needed)
3. Inspect installation for compliance with plans, specifications, and work order
4. Install proper timing and/or verify timing
5. Turn on signal
6. Check system for proper operation
7. Ensure all loops are properly detecting vehicles
8. During Turn On, fill out the attached final field signal checklist (punchlist). Not all items will be applicable to signal.
9. Give punchlist to project supervisor, who will give the list to contractor to correct any issues.
9. Sign cabinet maintenance log or place new cabinet card if one is not present.
10. Remove signs and other safety devices
11. Project Supervisor should notify traffic when punchlist has been corrected and signal is ready for reinspection.

Special Considerations

1 electricion tech may perform this work unless overhead work will be performed. An additional laborer is required for performing overhead work.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	3 Comm. No.	EFFECTIVE DATE	7/1/2013

FINAL FIELD CHECK LIST (PUNCH-LIST)
Activities 8550 and 8551

COMM. #: _____

INTERSECTION: _____

CITY: _____ CONTRACT NO. _____

COUNTY: _____

TURN ON DATE: _____

TURN ON TIME: _____

CONTRACTOR: _____

APPROVED	*REJECTED*	*CORRECTED*	*OVERHEAD INSTALLATION*
			1) Signal Heads
			A) Adequate Clearance ____1) Mast arm, span / Caternary 17-19 ft. ____2) Pole (side mount) greater than 10'
			B) Drip loops proper on heads, splice boxes, pole weather heads.
			C) All electrical connections tight ____1) Heads ____2) Disconnects and splice boxes
			D) Seal installed where nipple goes into head
			E) Stranded wire #14 home run from splice box to heads
			F) Check for proper bulb size ____1) 12" Head- Reds & Arrows - Approved LED Green & Amber - Approved LED ____2) Pedestrian (all) LED insert
			G) Proper installation of span hanger and balance adjuster
			H) Check for proper instalation of LED Lenes. Check for warranty sticker on back of LED
			I) Tethered heads are tied down properly
			J) Pelco \ Louver programmed Heads - proper degree of tilt and angle
			K) Proper lane alignment Veh. And Peds/LED Heads
			L) Horizontal spacing - 12' desired, 8' min.
			M) Check for proper visors (standard, tunnel, louvered tunnel
			O) Proper distance to stop bar (40' minimum)
			2) Traffic Signal Signs
			A) Assure that all traffic signal signs are accounted for and placed in proper location
			B) Verify that all traffic signal signs have a proper renewal sticker on its respective back side

APPROVED	*REJECTED*	*CORRECTED*	*POLES*
			3) Poles
			A) Caps if required (top & over anchor bolts)
			B) All leveling nuts tight against base and all threads used on nuts
			C) Washer for leveling and anchor nuts
			D) Anchor nuts tight
			E) Proper grouting (Weep Holes 1") or pole base banding properly bolted
			F) Grounded properly, no splices
			G) Check for damaged wire in pole
			H) Spices in pole waterproofed
			I) Entrance Switch ____1) Fasten properly (4' above ground properly connected to poles, separate entrances for service and load) ____2) Grounded properly (no splices) ____3) Contains breaker (50 Amps) ____4) Insulation on wire not damaged ____5) Proper color code (White-nuet.) ____6) Sealed and Waterproofed ____7) Meter Base installed properly
			J) Conduit properly fasten to pole (less than 3' from terminus, coupling; 10' max. vertical spacing)
			L) Raked properly (steel-near vertical; wood-1') (Steel strain Poles no raking)
			M) Weather head looks proper (insert in)
			N) All locations where pole, mast arm, or hardware has field installations (welded nipples for entrance switch, weather head, etc.) shall have proper protective coating (2 Coats rust inhibiting aluminum paint)
			O) Pole access cover (handhole) installed and tight.

APPROVED	*REJECTED*	*CORRECTED*	*SPAN AND CATENARY & CABINET*
			4) Span and Catenary
			A) Check for proper tightness
			B) Proper no. of Crosby clamps @ "A" frames; must be clamped (not under the span hanger)
			C) Minimum of 2 rope clamps on aerial cables at poles and down guides
			D) Proper loops for cables at changes in alignment and taped properly
			E) Proper # of cable rings (12" C-C)
			F) Square plates for eye bolts through wood poles (intersection side)
			H) Down guide fastened to same eye bolt as span/catenary cable/Wire Rope in Saddles @ Pole Bands
			I) Check for Service clips
			J) Tether cable to heads fastened properly
			5) CABINET
			A) Placed such that one looking can observe intersection (traffic flow)
			B) Bolted down properly (washers)
			C) Grounded properly ____1) Ground wire connected to conduit and cabinet grounding lug using solid, unspliced copper wire NO SMALLER THAN # 6 ____2) All terminal block of cabinet grounded properly to ground rod ____3 Ground connection tagged with resistance in ohms
			D) Check cabinet wirng ____1) Loop lead-in to proper terminal and labeled ____2) Field wiring ____a) Confirm field wiring connected to proper signal head ____b) Connected to proper cabinet terminal ____c) Check color code ____3) Check for damaged field wire
			E) All electrical connections are tight
			F) All spade lugs & crimp on connections tight
			G) Foundation drain has screen and cap, check to see if foundation will drain properly
			H) Thermostat of fan set at (95-100 F)
			I) Fan is pulling air out of cabinet
			J) Proper literature and schematics in plastic pouch
			K) Clean filter in cabinet
			L) Cabinet clean and orderly fashion
			M) All scratches painted, unless stainless steel or aluminum
			N) Cabinet proper height, G-38" + 2"to bottom; "M", "P"- on raised foundation with step PAD

APPROVED	*REJECTED*	*CORRECTED*	*CONTROLLER*
			6) CONTROLLER
			I) General A) Check flash operation ____1) Police panel switch ____2) Preferentiality, controller code properly set
			B) Breaker operation ____1) Small breaker (10 amp) controller only, allows flash operation for controller replacement ____2) Large Breaker (50 amps) kills intersection
			C) Controller setup per authorized timing sheet
			D) Check heat lamp and 115 receptable
			E) Check interconnect color code. Fiber connected properly. Radio Modem Programed is applicable.
			F) Check time clock program as per sheet, if needed
			G) Check all heads in intersection for proper signal indications at proper time
			II) Interconnect A) Check interconnect communications (fiber/radio) operation of controller
			B) Check for proper operation of various functions, manual cycle 1,2,3,4 splits, and offsets
			C) Check key board for proper operation
			D) If no timing given for other than cycle 1 then place same timings in other cycles and splits for safety
			E) Check for proper fuse sizes ____1) Interconnect 5 Amps if required ____2) Auxiliary power 15 Amps
			F) Cabinet prints and any speciality panel prints present and correct.
			III) Actuated A) Check key board operation and ease of reading screen
			B) Observe traffic flow as it relates to controller operation
			C) Check & tune loop amps/check
			D) Check cabinet wiring schematic to assure loop identifications is consistent with phasing and signal field terminal identification is consistent with phasing as indicated elsewhere on print
			E) Check conflict card for proper jumpers
			F) If overlap card required check for proper jumpers, or proper dip switches are turned on
			G) Confirm loops are putting calls to: ____1) Proper loop amp ____2) Proper controller phase
			H) Check placement of load switched and flash relays, assure proper number

APPROVED	*REJECTED*	*CORRECTED*	*CONTROLLER (Continued)*
			I) Controller phases are operating respective signal heads per intersection phasing
			J) Conflict monitor set properly
			K) Use loop checker to check loops in proper range (50-1000 uH)

Phase/Appr	uH reading	Phase/Appr	uH reading

			L) Check Controller Warranty Sticker, if Applicable
			M) Check controller initialization, codes
			N) Check for proper programming of auxiliary functions, such as: Dual entry, SGO, pre-emption program, overlaps, Det. Call program, etc.
			O) Check coordination programs
			7) Handholes
			A) Proper lid and resting firmly
			B) Bushing on conduit
			C) Grouted where conduit enters handhole
			D) Drain in bottom
			E) Approximately 10' of slack in hole for each cable run
			F) Check conduit fill
			G) If splices present, then check waterproofing
			8) MK Housing
			A) 4 bolts and 4 washers present
			B) Splices waterproofed properly
			C) Small amount of slack present
			D) Check to see if loops wired in series
			9) Approved & Authorized Changed DWG
			If applicable, Approved and Authorized Changed Drawing (As-built) must be received by District Traffic Section

SIGNATURES OF INSPECTORS: ***INSPECTION DATE:_____ TIME:_____***

NAME ***TITLE***

NAME ***TITLE***

ALL ITEMS ARE APPROVED OR CORRECTED. SIGNAL RECOMMENDED FOR ACCEPTANCE.

NAME ***TITLE*** ***DATE***

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	New Lighting Inspection	CODE	8551

Purpose

Inspection of new highway illumination installation to insure proper functioning, compliance to plans, specifications, and work order.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule as needed, in coordination with Construction activities.

Reporting

Reporting Units Structures

Accomplishment: The number of structures inspected.

Crew Size 1 Workers

	QTY
Electrician Tech 2 / Electrician 1	1

Job Specific Equipment

Signal Van / Pickup	1

P.P.E.

Base PPE

Materials

Other References

INDOT Standards and Specs Section 807

Sub Activities

Average Daily Production	15 Structures	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	New Lighting Inspection	CODE	8551

Work Method

1. Set up traffic control if required
2. Inspect installation for compliance with plans specifications
3. Make sure lights are functioning
4. Complete the attached final field checklist (punchlist). Not all items on list will be applicable for the light.
5. Send final checklist to project supervisor, who will give to contractor for correction
6. Project supervisor should let traffic know when contractor has completed any necessary repairs and is ready for reinpection.

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	15 Structures	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Signal/Flasher Equipment Replacement / Repair	CODE	8560

Purpose

This activity is for scheduled repair, replacement, and aerial inspections of existing traffic signal or flasher equipment.

Examples: Signal heads, disconnect hangers, junction box, span cables, wiring, signal cabinet change-out, poles, cantilevers, pedestals, service point, pedestrian heads, pedestal mount heads, side mounted head, pulling wiring, conduit repair, and other underground work.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

This activity should be scheduled and performed throughout the year.

Schedule work according to planned equipment upgrades.

Aerial Inspection should be performed once every 5 years on each signal.

Reporting | **Reporting Units** Comm. Nos.

Accomplishment: Number of commission numbers with components replaced or repaired.

Only one accomplishment shall be reported for each commition number.

Non scheduled repairs should be reported to activity 8500

Bulb changeouts should be reported to activity 8530 or 8535

Equipment updates or updgrades reported to activity 8570

Crew Size 1 - 2 Workers

	QTY
Electrician Tech 2	1 - 2

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Signal Van	1
Aerial Bucket / Lift Truck	1

*Traffic Control Equipment is NOT shown here

P.P.E.

1) Base PPE

2) Safety Harness/Fall Protection when using aerial lift

Materials

Determined by specific work to be preformed

Other References

INDOT Standars and Specs Section 805

OM 06-05 Aerial Inspections

Sub Activities

352 Aerial Work | 353 Signal Cabinet | 354 Underground Work | 345 Aerial Inspection

Average Daily Production	1 - 5 Comm. No.	EFFECTIVE DATE	4/1/2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Signal/Flasher Equipment Replacement / Repair	CODE	8560

Work Method

1. Place work area safety signs and devices
2. Repair / replace signal equipment
3. Sign cabinet maintenance card
4. Remove work area safety signs and devices
5. Observe signal to ensure proper function

AERIAL INSPECTION

1. Place work area safety signs and devices
2. Check and repair signal support cables, structures, and hardware such as pins, clevises, hangers, pole bands, cable clamps, etc.
3. Visually check signal head alignment and ensure proper orientation
4. Clean all LED module faces
5. Sign cabinet maintenance card
6. Remove work area safety signs and devices
7. Observe signal to ensure proper function

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	1 - 5 Comm. No	EFFECTIVE DATE	4/1/2015

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Signal and Flasher Equipment Upgrade	CODE	8570

Purpose

Scheduled installation of equipment upgrades at an existing signal or flasher installation such as left turn signal heads, back-plates, radio antennas, and signs.

Category Roadway/Drainage

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☒ Plan Location

Scheduling & Coordination

This activity can be scheduled and performed throughout the year.

Schedule work according to planned equipment upgrades.

Reporting — **Reporting Units** Comm. Nos.

Accomplishment: The number of commission numbers serviced.

Only one accomplishment can be reported for each commission number.

Bulb changeouts should be reported to activity 8530 or 8535

Replacement of existing equipment reported to activity 8560.

Crew Size 2 Workers

	QTY
Electrician Tech 2	2

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Signal Van	1
Arial Bucket / Lift Truck	1

*Traffic Control Equipment is NOT shown here

P.P.E.

1) Base PPE

2) Safety Harness/Fall Protection when using aerial lift

Materials

Determined by specific work to be performed.

Other References

Sub Activities

Average Daily Production	1 – 3 Comm. No.	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Signal and Flasher Equipment Upgrade	CODE	8570

Work Method

1. Place work area safety signs and devices
2. Install new equimpent specified by work order
3. Update signal maintenance card.
4. Clear up work area
5. Remove work area safety signs and devices
6. Observe signal operation

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	1 – 3 Comm. No.	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Signal and Flasher Installation / Removal	CODE	8590

Purpose

Installation or removal of an entire signal or flasher complete with sturctures and cabinet.

Category Roadway/Drainage

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☒ Plan Location

Scheduling & Coordination

This activity can be scheduled and performed throughout the year

Schedule should be based on planned locations.

Reporting

Reporting Units Comm. Nos.

Accomplishment: Number of complete signals or flashers installed or removed.

An accomplishment is given for any removal or install

Crew Size 3 Workers

	QTY
Electrician Tech 2	2
HT 3	1

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Signal Van	1
Arial Bucket / Lift Truck	1
Crane / Auger Truck	1
Pole Trailer	1

*Traffic Control Equipment is NOT shown here

P.P.E.

1) Base PPE

2) Safety Harness/Fall Protection when using aerial lift

Materials

Determined by specific work to be performed.

Other References

INDOT Standards and Specs Section 807

Sub Activities

355 Installation

356 Removal

Average Daily Production	0.22 - 1 Comm. No.	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Signal and Flasher Installation / Removal	CODE	8590

Work Method

INSTALL

1. Place work area safety signs and devices
2. Install all items according to plans:

   Foundations hand holes and conduit, loops, structures, span cables, wiring and juction box, marking and signs, controller and cabinet, and signal heads.
3. Test that signal is functioning properly
4. Clean up work area
5. Remove work area safety signs and devices
6. Observe signal operation

REMOVAL

1. Place work area safety signals and devices
2. Remove all signal equipment and structures at intersection (ex. cabinet, poles, span wire, signal heads).
3. Clean up work area
4. Remove work area safety signs and devices

Special Considerations

Not recommended as winter activity to help prevent accidents. Drivers may take time recognize signal install / removal, and stop times are likely to be increased during the winter.

APPROVED BY

Director, Highway Maintenance

Average Daily Production	0.22 - 1 Comm. No.	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Lighting Surveillance	CODE	8610

Purpose

Routine inspection of all lighting facilities for documenting outages and malfunctions.

Category Non-Road

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☒ Plan Location

Scheduling & Coordination

Each light should be inspected monthly.

Should be performed at night unless unique circumstances exist.

Reporting

Reporting Units Fixtures

Accomplishment: Reported in fixtures.

Crew Size 1 Workers

	QTY
Laborer	1

P.P.E.

Base PPE

Materials

Job Specific Equipment

Pickup Truck / Sedan	1

Other References

District Lighting Maps

Sub Activities

Average Daily Production	300 to1,200 Fixtures	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Lighting Surveillance	CODE	8610

Work Method

1. During hours of darkness
   a. Observe lights
2. During daylight hours
   a. Cover photocell or operate by-pass switch
   b. Observe lights
3. Record outages, malfunctions, and knockdowns

Special Considerations

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Average Daily Production	300 to1,200 Fixtures	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Lighting Repairs / Replacements	CODE	8620

Purpose

Repairing or replacing components of roadway, sign, underpass, and high mast illumination facilities, such as replacing bulbs, ballasts, fixtures, pulling wiring, repairing cable duct, conduit repair, and other maintencence work required to keep illumination functional.

Category Roadway/Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule work based on citizens complaints or results of monthly inspections (activity 8610)

Reporting | **Reporting Units** Fixtures

Accomplishment: The number fixtures repaired or replaced.

Scheduled bulb replacement reported to activity 8621

Crew Size 2 Workers

	QTY
Electrician Tech 2 / Electrician 1	1
HT 2	1

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

Signal Van / Pickup	1
Platform Truck	1

*Traffic Control Equipment is NOT shown here

P.P.E.

1) Base PPE

2) Safety Harness/Fall Protection when using aerial lift

Materials

Bulbs or LED Indications 922.04

Determined by specific work to be performed

Other References

INDOT Standards and Specs Section 807

Sub Activities

Average Daily Production	6 - 12 Fixtures	EFFECTIVE DATE	7/1/2013

WORK PERFORMANCE STANDARD

ACTIVITY	Lighting Repairs / Replacements	CODE	8620

Work Method

1. Place work area safety signs and devices
2. Verify outage. Use manual override if lights are currently off
3. Check fuse and voltage at base of pole
4. Use arial equipment to check bulbs and ballist
5. Follow all lock out / tag out procedures if repairing any electrical component.
6. Repair/replace necessary lighting components
7. Clean up work area
8. Remove work area safety signs and devices
9. Observe lighting operation

Special Considerations

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Director, Highway Maintenance

Average Daily Production	6 - 12 Fixtures	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Scheduled Lighting Bulb Replacement	CODE	8621

Purpose

Prevent light outages by conducting a scheduled lighting bulb replacement to insure the expected life of the bulb is not exceeded.

Category Roadway/Drainage

- ☒ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☒ **Plan Location**

Scheduling & Coordination

This activity should be scheduled year round; one third of feature inventory should be changed out yearly.

High mast towers can have bulbs changed out without a platform truck

Reporting | **Reporting Units** Bulbs

Accomplishment is the total bulbs replaced.

Non-scheduled bulb replacements are to be reported to 8620

Crew Size 2 Workers

	QTY
Laborer	2

*Traffic Control Personnel are NOT shown here

Job Specific Equipment

60 ft Platform Truck

*Traffic Control Equipment is NOT shown here

P.P.E.

1) Base PPE

2) Safety Harness/Fall Protection when using aerial lift

Materials

Lighting bulbs	922.04
Cleaning solution	

Other References

District lighting maps

Sub Activities

Average Daily Production	30 - 45 Bulbs	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Scheduled Lighting Bulb Change	CODE	8621

Work Method

1. Review lighting maps and schedule route
2. Load truck with appropriate bulbs
3. Set up safety signs and devices
4. Follow lock out / tag out procedures.
5. Standard lights use bucket/lift truck to access bulbs.
6. High mast towers lower the ballist to access bulbs.
7. Remove lens
8. Replace bulbs
9. Secure lens
10. Clean luminaire with cleaning solution
11. Inspect luminaire for obvious defects
12. Remove saftey signs and devices

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	30 - 45 Bulbs	EFFECTIVE DATE	July 1, 2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Underground Location Work	CODE	8630

Purpose

Locating underground signal and lighting conduits, hand-holes, detectors and housing, service wire, and other underground wiring by request from contractors or work orders to eliminate wire or conduit damage when digging.

Category Non-Road

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

Scheduling & Coordination

Schedule locations as required.

Reporting | **Reporting Units** Person Hours

Accomplishment: Reported in Person Hours

When performing locate work related to a signal or flasher, report to the commission number.

Crew Size 1 Workers

	QTY
Electrician Tech 2	1

Job Specific Equipment

Locator	1

P.P.E.

Base PPE

Materials

Marking Paint

Other References

As built plans

Sub Activities

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Underground Location Work	CODE	8630

Work Method

1. Place work area safety signs and devices as needed
2. Contact locate requestor to ensure exactly what and where needs to be located.
3. Review as built plans or other available documents (typically available in signal cabinets)
4. Determine closest access point to area of locate
5. Connect C-Clamp of locator to the utility line that will be located
6. Use locator and marking paint to sufficiently mark utility so the exact location is easily identifiable.
7. Remove work area safety signs and devices

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Gather Field Data	CODE	8920

Purpose

Collecting or editing field data for various roadway asset inventories and performing pavement marking retroreflectivity measurements.

Category Non-Road

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

Scheduling & Coordination

Perform throughout the year as required to gather necessary information.

Reporting

Reporting Units Person Hours

Accomplishment: Total person hours worked

Traffic control for QA's should be reported to activity 2791

Crew Size 1 - 2 Workers

	QTY
Laborer	1 - 2

P.P.E.

Base PPE

Materials

Job Specific Equipment

Sedan / Pickup	1
Pavement Marking Retroreflectometer	1

Other References

Road Logs
Sign Logs
Feature Inventories
Maintenance OP 1 - Maintenance Features Inventory
Operations Memo 10-06
Indiana Test Method 931
Indiana Design Manual Chapter 76

Sub Activities

78 Pavement Marking Inpsection

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Gather Field Data	CODE	8920

Work Method

Gather features inventory.

Various methods can be used including:GPS, Road Reference System, etc.

For Pavement Marking inspection:

1. Ensure retroreflectometer is fully charged, and callibrated prior to leaving the office.
2. Place any needed safety devices.
3. Pull vehicle full off road in a safe location.
4. Perform reflectivity readings in accordance with INDOT policies. Record readings and location.
5. Remove any safety devices.
6. Drive to next location, noting visual condition of markings along the way.

Special Considerations

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Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Disability/Workman's Compensation Leave	CODE	9000

Purpose

Report time spent by personnel on disability and/or workman's compensation leave.

Category Overhead

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

Scheduling & Coordination

Coordinate with District HR personnel to establish timeline for employees PeopleSoft status changes.

Reporting

Reporting Units Person Hours

Crew Size

Workers

QTY

P.P.E.

Materials

Job Specific Equipment

Other References

Sub Activities

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

WORK PERFORMANCE STANDARD

ACTIVITY	Disability/Workman's Compensation Leave	CODE	9000

Work Method

Special Considerations

APPROVED BY

Director, Highway Maintenance

Average Daily Production	Person Hours	EFFECTIVE DATE	7/1/2013

APPENDICES

This section contains tables and other useful documentation.

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

Appendix A

SQUARE YARDS OF ROAD SURFACE FOR VARIOUS ROAD WIDTHS

Road Width	Square Yards of Road Surface		
	Per Linear Foot	Per 100 Feet	Per Mile
6’	0.67	66.67	3,520
7’	0.78	77.78	4,107
8’	0.89	88.89	4,693
9’	1.00	100.00	5,280
10’	1.11	111.11	5,867
11’	1.22	122.22	6,453
12’	1.33	133.33	7,040
13’	1.44	144.44	7,627
14’	1.56	155.56	8,213
15’	1.67	166.67	8,800
16’	1.78	177.78	9,387
17’	1.89	188.89	9,973
18’	2.00	200.00	10,560
20’	2.22	222.22	11,733
22’	2.44	244.44	12,907

Road Width	Square Yards of Road Surface		
	Per Linear Foot	Per 100 Feet	Per Mile
24’	2.67	266.67	14,080
25’	2.78	277.78	14,667
26’	2.89	288.89	15,253
28’	3.11	311.11	16,427
30’	3.33	333.33	17,600
32’	3.56	355.56	18,773
34’	3.78	377.78	19,947
36’	4.00	400.00	21,120
38’	4.22	422.22	22,293
40’	4.44	444.44	23,467
50’	5.56	555.55	29,333
60’	6.67	666.67	35,200
70’	7.78	777.78	41,067
75’	8.33	833.33	44,000
80’	8.89	888.89	46,933

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

APPENDIX B

Mowing Swath Mile Chart
LENGTH (Miles)

Average Width of Cut **(feet)**

	0.1	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.5	0.8	1.0	1.3	1.5	1.8	2.0	2.3	2.5
2	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
3	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.6	0.7	0.8	1.5	2.3	3.0	3.8	4.5	5.3	6.0	6.8	7.5
4	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
8	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	4.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0
12	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0	6.0	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0
16	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0	8.0	12.0	16.0	20.0	24.0	28.0	32.0	36.0	40.0
20	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0	45.0	50.0
24	0.6	1.2	1.8	2.4	3.0	3.6	4.2	4.8	5.4	6.0	12.0	18.0	24.0	30.0	36.0	42.0	48.0	54.0	60.0
28	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.6	6.3	7.0	14.0	21.0	28.0	35.0	42.0	49.0	56.0	63.0	70.0
32	0.8	1.6	2.4	3.2	4.0	4.8	5.6	6.4	7.2	8.0	16.0	24.0	32.0	40.0	48.0	56.0	64.0	72.0	80.0
36	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	9.0	18.0	27.0	36.0	45.0	54.0	63.0	72.0	81.0	90.0
40	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0
44	1.1	2.2	3.3	4.4	5.5	6.6	7.7	8.8	9.9	11.0	22.0	33.0	44.0	55.0	66.0	77.0	88.0	99.0	110.0
48	1.2	2.4	3.6	4.8	6.0	7.2	8.4	9.6	10.8	12.0	24.0	36.0	48.0	60.0	72.0	84.0	96.0	108.0	120.0
52	1.3	2.6	3.9	5.2	6.5	7.8	9.1	10.4	11.7	13.0	26.0	39.0	52.0	65.0	78.0	91.0	104.0	117.0	130.0
56	1.4	2.8	4.2	5.6	7.0	8.4	9.8	11.2	12.6	14.0	28.0	42.0	56.0	70.0	84.0	98.0	112.0	126.0	140.0
60	1.5	3.0	4.5	6.0	7.5	9.0	10.5	12.0	13.5	15.0	30.0	45.0	60.0	75.0	90.0	105.0	120.0	135.0	150.0
64	1.6	3.2	4.8	6.4	8.0	9.6	11.2	12.8	14.4	16.0	32.0	48.0	64.0	80.0	96.0	112.0	128.0	144.0	160.0
68	1.7	3.4	5.1	6.8	8.5	10.2	11.9	13.6	15.3	17.0	34.0	51.0	68.0	85.0	102.0	119.0	136.0	153.0	170.0
72	1.8	3.6	5.4	7.2	9.0	10.8	12.6	14.4	16.2	18.0	36.0	54.0	72.0	90.0	108.0	126.0	144.0	162.0	180.0
76	1.9	3.8	5.7	7.6	9.5	11.4	13.3	15.2	17.1	19.0	38.0	57.0	76.0	95.0	114.0	133.0	152.0	171.0	190.0
80	2.0	4.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0	40.0	60.0	80.0	100.0	120.0	140.0	160.0	180.0	200.0
84	2.1	4.2	6.3	8.4	10.5	12.6	14.7	16.8	18.9	21.0	42.0	63.0	84.0	105.0	126.0	147.0	168.0	189.0	210.0
88	2.2	4.4	6.6	8.8	11.0	13.2	15.4	17.6	19.8	22.0	44.0	66.0	88.0	110.0	132.0	154.0	176.0	198.0	220.0
92	2.3	4.6	6.9	9.2	11.5	13.8	16.1	18.4	20.7	23.0	46.0	69.0	92.0	115.0	138.0	161.0	184.0	207.0	230.0
96	2.4	4.8	7.2	9.6	12.0	14.4	16.8	19.2	21.6	24.0	48.0	72.0	96.0	120.0	144.0	168.0	192.0	216.0	240.0
100	2.5	5.0	7.5	10.0	12.5	15.5	17.5	20.0	22.5	25.0	50.0	75.0	100.0	125.0	150.0	175.0	200.0	225.0	250.0

APPENDIX B

EXAMPLE CALCULATIONS
SWATH MILES OF MOWING

EXAMPLE 1

The average width of the right-of-way mowed is 15 feet.
The distance mowed is 1 mile.

By use of the chart the swath miles are determined to be:

1.0 mile @ average width 15 feet =3.8 swath miles mowed

EXAMPLE 2

The average width of the right-of-way mowed is 40 feet.
The distance mowed is 2.7 miles.

By use of the chart the swath miles are determined to be:

2.0 miles @ average width 40 feet =	20.0 swath miles mowed
0.7 miles @ average width 40feet =	7.0 swath miles mowed
Total	27.0 swath miles mowed

EXAMPLE 3

The average width of the right-of-way mowed is 18 feet.
The distance mowed is 7.8 miles.

By use of the chart the swath miles are determined to be:

7.0 miles @ average width 16 feet =	28.0 swath miles mowed
0.8 miles @ average width 16 feet =	3.2 swath miles mowed
7.0 miles @ average width 3 feet =	5.3 swath miles mowed
0.8 miles @ average width 3 feet =	0.6 swath miles mowed
Total	37.1 swath miles mowed

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

Appendix C

Acreage Chart

LENGTH (Miles)

Width (Feet)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	2	3	4	5	6	7	8	9	10
1'	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.2
2'	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.5	0.7	1.0	1.2	1.5	1.7	1.7	2.2	2.4
3'	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.7	1.1	1.5	1.8	2.2	2.6	2.9	3.3	3.6
4'	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.5	1.0	1.5	1.9	2.4	2.9	3.4	3.9	4.4	4.9
5'	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.6	1.2	1.8	2.4	3.0	3.6	4.2	4.9	5.5	6.1
6'	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.7	1.5	2.2	2.9	3.6	4.4	5.1	5.8	6.5	7.3
7'	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.7	2.6	3.4	4.2	5.1	5.9	6.8	7.6	8.5
8'	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.9	2.9	3.9	4.9	5.8	6.8	7.8	8.7	9.7
9'	0.1	0.2	0.3	0.4	0.6	0.7	0.8	0.9	1.0	1.1	2.2	3.3	4.4	5.5	6.5	7.6	8.7	9.8	10.9
10'	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.2	2.4	3.6	4.9	6.1	7.3	8.5	9.7	10.9	12.1
20'	0.2	0.5	0.7	1.0	1.2	1.5	1.7	1.9	2.2	2.4	4.9	7.3	9.7	12.1	14.6	17.0	19.4	21.8	24.2
30'	0.4	0.7	1.1	1.5	1.8	2.2	2.6	2.9	3.3	3.6	7.3	10.9	14.6	18.2	21.8	25.5	29.1	32.7	36.4
40'	0.5	1.0	1.5	1.9	2.4	2.9	3.4	3.9	4.4	4.9	9.7	14.6	19.4	24.2	29.1	33.9	38.8	43.6	48.5
50'	0.6	1.2	1.8	2.4	3.0	3.6	4.2	4.9	5.5	6.1	12.1	18.2	24.2	30.3	36.4	42.4	48.5	54.6	60.6
60'	0.7	1.5	2.2	2.9	3.6	4.4	5.1	5.8	6.6	7.3	14.6	21.8	29.1	36.4	43.6	50.9	58.2	65.5	72.7
70'	0.9	1.7	2.6	3.4	4.2	5.1	5.9	6.8	7.6	8.5	17.0	25.5	33.9	42.4	50.9	59.4	67.6	76.4	84.9
80'	1.0	1.9	2.9	3.9	4.9	5.8	6.8	7.8	8.7	9.7	19.4	29.1	38.8	48.5	58.2	67.9	77.6	87.3	97.0
90'	1.1	2.2	3.3	4.4	5.5	6.6	7.6	8.7	9.8	10.9	21.8	32.7	43.6	54.6	65.5	76.4	87.3	98.2	109.1
100'	1.2	2.4	3.6	4.9	6.1	7.3	8.5	9.7	10.9	12.1	24.2	36.4	48.5	60.6	72.7	84.9	97.0	109.1	121.2

Appendix C

EXAMPLE CACULATIONS
ACRES

EXAMPLE 1

The average width of the right-of-way sprayed is 30 feet. The distance sprayed is 1 mile.

By use of the chart acreage sprayed is determined to be:

1.0 mile @ average width 30 feet = 3.6 acres sprayed

EXAMPLE 2

The average width of the right-of-way sprayed is 40 feet. The distance is 2.7 miles.

By use of the acreage sprayed is determined to be:

2.0 miles @ average width 40 feet = 9.7 acres sprayed
0.7 miles @ average width 40 feet = 3.4 acres sprayed
Total 13.1 acres sprayed

EXAMPLE 3

The average width of the right-of-way sprayed is 35 feet. The distance mowed is 7.8 miles

By use of the chart acreage sprayed is determined to be:

7.0 miles @ average width 30 feet = 25.5 acres sprayed
0.8 miles @ average width 30 feet = 2.9 acres sprayed
7.0 miles @ average width 5 feet = 4.2 acres sprayed
0.8 miles @ average width 5 feet = 0.5 acres sprayed
Total 33.1 acres sprayed

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

APPENDIX D

STORAGE CAPACITY (IN TONS)
OF CONE – OR TENT- SHAPE STOCKPILES OF CRUSHED STONE
Base Width (Diameter) In Feet

	10	15	20	25	30	35	40	45	50	55	60	65	70	75
10	5													
12.5	8													
15	11	19												
17.5	13	24												
20	16	30	44											
22.5	19	36	54											
25	21	42	65	86										
27.5	24	48	75	100										
30	26	54	86	120	150									
32.5	29	60	96	130	170									
35	32	66	110	150	200	240								
37.5	34	72	120	170	220	270								
40	37	78	130	180	240	300	350							
42.5	40	83	140	200	270	330	390							
45	42	89	150	220	290	360	440	500						
47.5	45	95	160	230	310	400	480	550						
50	47	100	170	250	340	430	520	610	690					
52.5	50	110	180	270	360	460	560	660	750					
55	53	110	190	280	380	490	600	710	820	910				
57.5	55	120	200	300	400	520	640	770	880	990				
60	58	120	210	320	430	560	690	820	950	1100	1200			
62.5	61	130	220	330	450	590	730	870	1000	1200	1300			
65	63	140	230	350	480	620	770	920	1100	1200	1400	1500		
67.5	66	140	240	360	500	650	800	980	1100	1300	1500	1600		
70	68	150	250	380	5340	680	850	1000	1200	1400	1600	1700	1900	
72.5	71	150	260	400	550	720	900	1100	1300	1500	1700	1800	2000	
75	74	160	270	410	570	750	940	1100	1300	1500	1800	2000	2100	2300

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

APPENDIX D

STORAGE CAPACITY (IN TONS)
OF CONE – OR TENT- SHAPE STOCKPILES OF SAND
Base Width (Diameter) In Feet

	10	15	20	25	30	35	40	45	50	55	60	65	70	75
10	4													
12.5	6													
15	8	15												
17.5	10	19												
20	13	24	34											
22.5	15	28	43											
25	17	33	51	67										
27.5	19	38	59	80										
30	21	42	67	93	116									
32.5	23	47	75	106	135									
35	25	51	84	118	153	184								
37.5	27	56	92	131	171	209								
40	29	61	100	144	190	235	275							
42.5	31	65	106	157	208	260	308							
45	33	70	116	170	227	285	341	392						
47.5	35	74	125	183	245	310	374	433						
50	37	79	133	195	264	335	406	475	537					
52.5	39	83	141	208	282	360	439	516	589					
55	41	88	149	283	301	385	472	558	640	715				
57.5	43	93	157	234	319	410	505	599	691	777				
60	45	98	166	247	338	436	538	641	742	839	928			
62.5	47	102	174	259	356	461	570	682	794	901	1002			
65	49	107	182	272	374	486	603	724	845	963	1076	1180		
67.5	51	111	190	285	393	511	636	765	896	1025	1150	1267		
70	54	116	198	298	411	536	669	807	947	1087	1224	1354	1474	
72.5	56	121	207	311	430	561	702	849	999	1149	1298	1440	1575	
75	58	125	215	324	448	586	734	890	1050	1211	1371	1527	1675	1813
	10	15	20	25	30	35	40	45	50	55	60	65	70	75

APPENDIX D

STORAGE CAPACITY (IN TONS)
OF CONE – OR TENT- SHAPE STOCKPILES OF SALT
Base Width (Diameter) In Feet

	10	15	20	25	30	35	40	45	50	55	60	65	70	75
10	3													
12.5	5													
15	6	11												
17.5	8	15												
20	10	18	26											
22.5	11	22	33											
25	13	25	39	51										
27.5	14	29	454	61										
30	16	32	51	71	89									
32.5	17	36	58	81	103									
35	19	39	64	90	117	141								
37.5	21	43	70	100	131	160								
40	22	46	76	110	145	179	210							
42.5	24	50	83	120	159	198	235							
45	25	53	89	130	173	218	260	299						
47.5	27	57	95	139	187	237	285	331						
50	28	60	101	149	201	256	310	363	410					
52.5	30	64	108	159	216	275	335	394	450					
55	31	67	114	169	230	294	360	426	489	546				
57.5	33	71	120	179	244	313	386	458	528	594				
60	35	75	127	188	258	339	411	489	567	641	709			
62.5	36	78	133	198	272	352	436	521	606	688	766			
65	38	82	139	208	286	371	461	553	645	736	822	902		
67.5	39	85	145	218	300	390	486	585	685	783	878	968		
70	41	89	152	228	314	109	511	616	724	831	935	1034	1126	
72.5	42	92	158	237	328	429	536	648	763	878	991	1100	1203	
75	44	96	164	247	342	448	561	680	802	925	1048	1166	1280	1385
	10	15	20	25	30	35	40	45	50	55	60	65	70	75

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

RPM Inspection Report

Activity 2560

Subdistrict/Unit		RPM Inspection Report						
Contract Number	Road	From: (reference marker)	To: (reference marker)	RPM deficiency categories 1	2	3	4	Date

Legend: 1- # of castings missing 2 - # of castings removed 3 - # of lenses to be replaced 4 - # other

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE
APPENDIX E

**** US TO METRIC CONVERSION TABLES ****

*** LINEAR MEASUREMENTS ***

US MEASURE	UNITS	US MEASURE	UNITS	METRIC MEASURE	UNIT	METRIC MEASURE	UNIT
1	in	0.08333	ft	2.54	cm	25.4	mm
1	ft	12	in	0.3048	m	30.48	cm
1	yd	3	ft	0.914402	m	91.4402	cm
1	sta	100	ft	30.48	m	0.03048	km
1	mi	5,280	ft	1,609.35	m	1.60935	km
0.03937	in	0.003281	ft	1	mm	0.001	m
0.3937	in	0.032808	ft	1	cm	10	mm
39.37	in	3.2808	ft	1	m1.	1.000	mm
1.093611	yd	0.032808	sta	1	m	100	cm
3,280.8	Ft	0.62137	mi	1	km	1,000	m

*** SQUARE MEASUREMENTS ***

1	sq in	0.006944	sq ft	6.4516	sq cm	0.00064816	sq m
1	sq in	144	sq in	929.0341	sq cm	0.09290341	sq m
1	sq yd	9	sq ft	8,361.307	sq cm	0.8361307	sq m
1	ac	43,560	sq ft	4,046.873	sq m	0.4046873	ha
1	sq mi	640	ac	258.9998	ha	2.589998	sq km
0.00155	sq in			1	sq mm	0.01	sq cm
0.155	sq in	0.0010764	sq ft	1	sq cm	100	sq mm
10.7639	sq ft	1.19598	sq yd	1	sq m	10,000	cq cm
11,959.8	sq yd	2.471	ac	1	ha	10,000	sq m
1,195,985	sq yd	247.104	ac	1	sq km	1,000,000	sq m

*** CUBIC MEASUREMENTS ***

1	cu in	0.0005787	cu ft	16.3872	cu mm	0.000016387	cu m
1	cu ft	0.037037	cu yd	0.000028317	cu m	28.31701	1
1	cu yd	27	cu ft	0.76456	cu m	764,560	cu cm
		0.000061023	cu in	1	cu mm		
0.061023	cu in	0.0000353	cu ft	1	cu cm	1000	cu mm
35.314	cu ft	1.30794	cu yd	1	cu m	1,000,000	cu cm
61.026	cu in	0.035316	cu ft	1	l	1,000	cu cm

*** WEIGHT MEASUREMENTS ***

1	grain	0.0022857	oz	0.064799	g	64.799	mg
1	oz	0.0625	lb	28.349	g		
1	lb	16	oz	453.592	g	0.45359	kg
1	hund wt	100	lb	45.359	kg	0.0453592	mt
1	t	2000	lb	907.18	kg	0.907185	mt
0.035274	oz	0.0022046	lb	1	g	1000	mg
2.20462	lb	0.0011023	t	1	kg	1000	g
2,204.62	lb	1.10231	t	1	mt	1000	kg

*** VOLUME MEASUREMENTS ***

1	pt	28.875	cu in	0.473167	1	473.167	cu cm
1	qt	57.75	cu in	0.94633	1		
1	gal	231	cu in	3.78531	1	0.0037854	cu m
1	bar	31.5	gal	119.238	1	0.119238	kl
0.264178	gal	1.05668	qt	1	1		
61.025	cu in	0.035316	cu ft	1	1		

APPENDIX E

ABBREVIATIONS

in = inches	sq = square	mm = millimeters
ft = feet	cu = cubic	cm = centimeters
yd = yards		m = meters
sta = stations (100 feet)		km = kilometers
ac = acres		ha = hectare
mi = miles		ml = milliliters
oz = ounces		l = liters
lb = pounds		kl = kiloliters
hund wt = hundred weight		mg = milligrams
t = short tons		cg = centigrams
pt = pints		g = grams
qt = quart		kg = kilograms (kilos)
gal = gallon		mt = metric tons
bar = barrel		°C = Celsius
F= Fahrenheit		°K = Kelvin

TEMPERATURE CONVERSIONS

To convert degrees Fahrenheit to degrees Celsius, use this formula:

°Fahrenheit minus 32, times 5, divided by 9 = degrees Celsius

EXAMPLE 68 °F – 32 = 36 x 5 = 180, 180/9 = 20 °C (Celsius)

To convert degrees Celsius to degrees Fahrenheit, use this formula:

°Celsius time 9, divided by 5, plus 32 = Fahrenheit

Example: 20° C x 9 = 180, 180/5 = 36, + 32 = 68 °F

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

APPENDIX F

LIST OF COUNTY NAMES AND NUMBERS

No.	Name	No.	Name
01	Adams	47	Lawrence
02	Allen	48	Madison
03	Bartholomew	49	Marion
04	Benton	50	Marshall
05	Blackford	51	Martin
06	Boone	52	Miami
07	Brown	53	Monroe
08	Carroll	54	Montgomery
09	Cass	55	Morgan
10	Clark	56	Newton
11	Clay	57	Noble
12	Clinton	58	Ohio
13	Crawford	59	Orange
14	Daviess	60	Owen
15	Dearborn	61	Parke
16	Decatur	62	Perry
17	Dekalb	63	Pike
18	Delaware	64	Porter
19	Dubois	65	Posey
20	Elkhart	66	Pulaski
21	Fayette	67	Putman
22	Floyd	68	Randolph
23	Fountain	69	Ripley
24	Franklin	70	Rush
25	Fulton	71	St. Joseph
26	Gibson	72	Scott
27	Grant	73	Shelby
28	Greene	74	Spencer
29	Hamilton	75	Starke
30	Hancock	76	Steuben
31	Harrison	77	Sullivan
32	Hendricks	78	Switzerland
33	Henry	79	Tippecanoe
34	Howard	80	Tipton
35	Huntington	81	Union
36	Jackson	82	Vanderburgh
37	Jasper	83	Vermillion
38	Jay	84	Vigo
39	Jefferson	85	Wabash
40	Jennings	86	Warren
41	Johnson	87	Warrick
42	Knox	88	Washington
43	Kosciusko	89	Wayne
44	LaGrange	90	Wells
45	Lake	91	White
46	LaPorte	92	Whitley

INDOT WORK PERFORMANCE STANDARDS

DIVISION OF MAINTENANCE

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