Section 26:

Traffic Management

SECTION 26 – TRAFFIC MANAGEMENT

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26.2 LAW ENFORCEMENT OFFICER (LEO)

The information presented herein is in accordance with 23 Code of Federal Regulations 630.1106(a) and Indiana Code 8-23-2-15(b). **RSP 801-R-672** details the use of a Law Enforcement Officer, LEO, as an aid to a contract maintenance of traffic, MOT, plan. The RSP details the requirements for personnel, equipment, and training of a LEO. It also describes the responsibilities of the Contractor, the Engineer, and the LEO to maintain operational consistency from contract to contract.

The use of a LEO on a contract is determined based on the specific needs of the contract for queue protection and speed management. LEOs are a limited resource and should be limited to projects and circumstances where and when the Department determines their presence provides the best effectiveness and value. Not every contract will require a LEO. If it is determined that a LEO would add value to the contract MOT plan, the LEO item should be incorporated into the contract during the design process. A LEO can also be added to an existing contract through the change order process, in accordance with 109.05 of the SS, when the Department authorizes their use. LEOs, as well as all other individuals working under a Department contract, are subject to the requirements of 108.07 of the SS and, as such, may be removed from the contract if their actions or manner is deemed a detriment to the operations. The Department maintains this ability.

26.2.1 Definition

As defined within the RSP and when a LEO is expressly authorized by the Department and present on a contract, they are required to be:

1. off-duty,
2. a non-Indiana State Police Law Enforcement Officer in full police uniform,
3. a graduate of the Indiana approved Law Enforcement Academy, and
4. a police officer or deputy actively employed by a police agency in Indiana.

LEOs are to be placed on contracts to supplement the MOT plan by providing **queue protection, speed management, and patrolling the site**. Any LEO used on a contract through the RSP shall:

1. Be limited to those duties that the police officer normally performs while on active duty; and
2. Do not include the duties of a
   a. Flagman; or
   b. Security Officer.

Indiana State Police, ISP, officers are not considered as LEOs. The use of ISP officers on State contracts is detailed within separate agreements between the Department and ISP. An ISP officer

is paid utilizing specific funding appropriated by the legislature for their use on Department contracts. The use of ISP officers is determined through coordination between the Department and ISP. ISP time on Department contracts is estimated prior to the start of the contract and then tracked in the field for payment using the appropriated funds described above.

26.2.2 Purpose

The purpose of the LEO is to provide a law enforcement presence on State and local routes to help increase the traveling public's awareness of queue development and speed management within a construction work zone.

The use of a LEO should be considered when:

1. working on high volume state roads and highways, or local roads and streets,
2. frequent set ups or tear downs of MOT operations within high volume or urbanized traffic locations are occurring,
3. substantial traffic shifts are planned,
4. night work MOT operations suggest queue and speed management problems,
5. multiple lanes of divided highways are planned to be shifted or closed as part of MOT operations,
6. long term lane closures or lane shifts are planned,
7. the first and last days of major changes in traffic control set-ups occur, and
8. observed queue backups or speed management issues have the potential to cause harm to workers or the traveling public.

In most cases, the use of a LEO should not be considered when **interstate** highway queue protection or speed restriction enforcement is being considered. In these situations, ISP is normally called upon to perform interstate queue and speed management.

Exceptions to the above statement occur when LEO officers **with experience in specific high-traffic, high-volume locations** are utilized or are used in support of ISP officers on interstates.

Examples of these specific locations include areas within the Indianapolis metropolitan area including I-465, I-70, I-65, and I-74. Additional locations include interstates I-80/94 and I-65 in northwestern Indiana and I-65 in southern Jefferson County.

There are agreements in place between the Department and local law enforcement agencies within many of these higher volume areas that can be used to help identify and evaluate appropriate LEO involvement on interstates.

An additional exception would occur when a LEO is determined to be utilized as **additional and qualified enforcement support** to ISP officers on interstates for queue protection and speed management.

Questions concerning existing agreements for interstate LEO usage, based on the examples indicated above, should be directed to the Department's Work Zone Safety Section.

26.2.3 Determination of Use

The presence of uniformed police officers in a police agency issued vehicle with red and blue lights provides a benefit as an initial means to slow traffic on approach to a queue. The determination to utilize a LEO should be based upon:

1. The specific potential for traffic queuing:
    a. potential for queuing generally begins with traffic counts;
    b. the counts are processed using the Department's queue modeling tool to determine potential for and length of queue;
    c. the queue modeling tool provides an accurate predictive relationship for relative durations and lengths of queues.

Example: A predicted queue of 4 miles for 8 hours per day will, in most cases, result in lengthy queues even if the actual length might vary slightly from the predicted model. Likewise, short duration or short lengths of predicted queues would typically be a good indication that regular, lengthy queues will not occur.

Queues can be significantly greater than predicted depending on specific actual field conditions such as worker and truck presence within the work zone.

2. Speed management:
    a. reduction of speed prior to and through the work zone,
    b. worker safety, and
    c. traveling public safety.

3. Patrolling:
    a. patrolling through the work zone with lights off may be a necessary aspect of the Leo's shift, and
    b. patrolling through the site helps the traveling public identify that there is the potential for citations and tickets to be issued within the work zone for infractions.

26.2.4 Field Conditions

A LEO may still be considered when traffic counts and modeling would not initially indicate the necessity.

LEO usage is an important tool, but should not take the place of properly utilized MOT devices as described in the Indiana MUTCD.

When actual field conditions influence design developed traffic count modeling, the choice to use a LEO will require Department field staff, including the PEMS, AE, and the DCD, to determine if the addition and utilization of LEOs on the contract would be an effective use of resources. If field observations indicate the need for a LEO, based on unacceptable queuing situations or for speed management, the determination to add a LEO should be reviewed and discussed with the contract MOT team including the Contractor and Designer.

The use of a LEO should be considered for queue and speed management situations involving:

1. state roads and highways; and
2. local street and roadway contracts.

There are contract queue protection and speed management situations in which the use of a LEO would be advantageous for local contracts when posted speeds are 45 mph or less. Situations where the use of a LEO for local streets and roadways should be considered include:

1. high volume or congested streets and roadways,
2. narrowing of lanes in urban locations,
3. temporary closure of lanes,
4. lane-by-lane local bridge rehabilitation,
5. reduction of speeds through a local work zone, and
6. when there is observed queue backups or speed management issues that have the potential to cause harm to workers or the traveling public.

As with other work zone contract choices, the determination to utilize a LEO on a local contract should be discussed with the MOT team.

Additional aspects to consider when evaluating the use of a LEO include the extent of worker exposure to high-speed traffic and the observance of excessive speeds in advance of and within the work zone. In these cases, the utilization of a LEO for speed management would be an advantage for both worker and traveling public safety.

Existing implementation of other traffic control features may also affect the need and use of a LEO. Modification of or the use of these features may curtail or eliminate the need for a LEO. These features include:

1. the use and location of existing signage,
2. barrier wall,
3. arrow boards,
4. changeable message signs,
5. temporary worksite speed display assemblies,
6. truck mounted attenuators.

26.2.5 Discussion Topics

Topics of discussion prior to the addition of a LEO on a contract should include:

1. the intended message of the MOT plan and the perception of the plan by the traveling public,
2. the availability of traffic counts to help determine queue predictions,
3. the improved message of the overall intent of the MOT plan with the addition of a LEO, and
4. the most advantageous times and placement of the LEO to achieve the best overall desired outcome for queue protection and speed management.

26.2.6 Implementation

The requirements within these instructions and RSP 801-R-672 are to be followed for LEO implementation on any contract. **A contract must include RSP 801-R-672 to utilize a LEO**. If the contract does not contain the RSP, the Contractor must obtain a zero dollar change order to include the RSP on the contract prior to utilizing the LEO for the contract. Additionally, the following must be observed:

1. LEOs procured directly from a government agency or local entity do not require a subcontract.
2. If a LEO is provided by a private company, the Contractor must execute a Department approved subcontract for the private company prior to utilizing the LEO on the contract.
3. Any potential DBE, MBE, WBE, or IVBE credit for LEO usage will be available only to a certified DBE, MBE, WBE, or IVBE company.
4. LEO services are limited to the activities described within RSP 801-R-672 and IC 8-23-2-15(b).

Individuals offering or performing services outside of these requirements are not considered LEOs, must not perform the duties of a LEO, and are not to be paid as a LEO.

26.2.7 Responsibility and Coordination

The responsibilities of and coordination between the Contractor, the Engineer, and the LEO are outlined within the RSP. The Contractor will be responsible for the activities of the LEO while they are performing contract specific duties. The Engineer has the responsibility to maintain, direct, or modify the Contractor assigned activities of the LEO based on the operational need and safety of the contract and the traveling public. The LEO should be relocated, as necessary, to enable queue protection and speed management. The LEO must remain effective and aid in the conveyance of the intended requirements of the overall contract MOT plan after any relocation directed by the Department.

1. LEO

The LEO has the responsibility to:

a. report to the Contractor at the start and end of their designated shift. The Contractor is responsible to provide, with the approval of the Engineer, instruction to the LEO for work assignments at the start of each shift,

b. remain at the contract site for the duration of their shift, and

c. perform other duties, as assigned, to help enforce speed reduction through the site when their original assigned duties have been completed.

2. Contractor

The Contractor has the responsibility to:

a. secure the services of a LEO and communicate the intentions for use of the position with the selected officer,

b. assign the duties and placement of the LEO. **The choice of duties and the placement of the LEO are subject to approval of the Engineer**,

c. inform the Engineer of the start and completion of the LEO shift, and

d. ensure that the LEO remains on-site for the duration of the approved shift and inform the Engineer of problems or concerns arising from the placement or effectiveness of the LEO.

3. Engineer

The Engineer retains authority over all contract activities. If the placement of any MOT device or service is deemed inappropriate or detrimental to the overall MOT plan, the Engineer has the authority to:

a. direct changes and modify the MOT to provide a safer work zone condition,

b. maintain authority over the Contractor's assigned duties and placement of any LEO,

c. confirm the LEO is performing their appropriate duties according to their placement on the contract. Even though the Contractor is to direct the duties and placement of LEOs, those instructions are subject to the authority and direction of the Engineer while the LEO is associated with the contract, and

d. direct the LEO to perform enforcement and other related duties to help encourage the traveling public to "respect the work zone".

All LEOs are to follow established procedures, in accordance with Indiana Code 9-21-5-11, for infraction and ordinance violation enforcement while working the construction site. LEOs are encouraged to pursue motorists **only** when the actions of those motorist are considered reckless and endanger the workers or traveling public at the site. They should also provide response to incidents that involves public safety near or within the limits of the contract.

The placement of a LEO behind barrier wall is not an effective use of this limited resource service.

26.2.8 Training

Prior to the placement of the LEO on site, training must be completed. Associated training for LEO operations consists of two parts. The first training portion consists of completing the Department's web-based training course. The second portion consists of completing the Department's supplementary guidance on LEOs working within construction zones.

1. Part 1 - Training

Prior to involvement in maintenance of traffic operations, the LEO, at least one representative of the Contractor who will be on-site when the LEO is present, and the Engineer must complete the Department's web based "Law Enforcement Officers in INDOT Work Zones Training Video (Part 1)". The course is described within the RSP and can be accessed through the Department's Law Enforcement Officers for Work Zone Safety website at:
https://www.in.gov/indot/safety/work-zone-safety/law-enforcement-officers-for-work-zone-safety/

2. Part 2 - Training

The LEO, the Contractor, and the Engineer are also required to review, discuss, and agree to adhere to the requirements contained in the Department specific training entitled "Instructions For Non-ISP Law Enforcement Officers When Working in INDOT Work Zones (Part 2)". The training document can be accessed through the Department's Law Enforcement Officers for Work Zone Safety website at:
https://www.in.gov/indot/safety/work-zone-safety/law-enforcement-officers-for-work-zone-safety/

Participants completing Parts 1 and 2 training must sign and date the Participant Affirmation page at the end of the Part 2 training document. By signing, the individuals are confirming they have completed Parts 1 and 2 of the law enforcement training requirements. The PEMS must sign and date the Verification Statement at the end of the training document. The training document, all notes, and the signature information are to be retained within the contract files.

26.2.9 Payment

1. Approved Shift Hours

Payment for the use of a LEO is governed by the process outlined within the RSP. The LEO is paid based on an hourly rate for their service. Payment is only provided for LEOs approved for use on the contract by the Department. Payable hours are determined based on the number of approved shift hours that the LEO is utilized for MOT operations. Each portion of an hour required will be measured as a whole hour. Example: If a LEO is required and works for 3 1/4 hours, they will be paid for 4 hours.

2. Training

Training costs will not be measured for payment. Contractors are to include any training costs in the cost of the other items of the contract.

26.3 OVERHEAD SIGN STRUCTURES

Loose anchor bolt hardware or hardware out of position is a common issue found during inspection of overhead sign structures. Many times, hardware may be properly re-tightened by the Contractor. Care must be taken when applying any re-tightening force to prevent seized anchor bolts from cracking or stripping.

Out of position anchor bolts are found not only on older structures but also on new installations. They can lead to premature fatigue and structures being removed from service. The PEMS must verify Contractors are following best practices in accordance with 802.07(b) of the SS. Best practices include tightening the nuts by following the “star pattern” order as indicated within Standard Drawing E 802-SBTS-17. Additionally, for truss structures, the hardware should be checked and re-tightened as needed after the truss has been set in place.

26.4 GROUND MOUNTED PANEL SIGN SUPPORTS

The W-beam structural steel supports for ground mounted panel signs are designed to meet the AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals. As detailed in the SS and Standard Drawings, they are also compliant with FHWA’s eligibility requirements for roadside hardware.

Proper installation is necessary for supports to withstand the design wind loadings and to breakaway during a vehicular impact so the occupants within the vehicle have a significantly reduced chance of being seriously injured or killed.

Particular attention should be paid to the following:

1. There should be no perceivable gap between the upper and middle beam sections at the fuse/hinge plate – the allowable tolerance for this fit is 0 to 1/16 in. The fuse plate/hinge plate attachment hardware should be fully tightened in accordance with the SS and Standard Drawings. Excessive gaps and loose hardware result in premature fatigue in the fuse plates which can result in structural failures. The fuse plates are intentionally weakened via the perforated holes. This feature facilitates breakaway performance during impact. Refer to Standard Drawing E 802-SNGP-05 for fuse plate details.
2. The perforated fuse plate must be installed on the front (traffic approach) side of the sign and the hinge plate on the back side for the supports. Refer to Standard Drawing E 802-SNGP-05 for plate connection details.
3. The hardware at the base plate must be properly tightened within the range provided in the SS and the Standard Drawings. The specified torque values are sufficient so that the structure should not "walk-off" the base and foundation but not so great as to prevent the breakaway slip mechanism from engaging when the structure is impacted.
4. The beams must extend through the entire height of the sign. Refer to Standard Drawing E 802-SNGP-02 for beam placement.

Properly installed sign clips allow an even distribution of the forces transmitted from the sign to the beams improving the service life of the structure. Refer to 802.08(b) of the SS and the Standard Drawings.

26.5 LIGHTING LEVELS

Illumination levels, the amount of light that reaches the pavement, and the Correlated Color Temperature (CCT) can be verified after installation by use of a Chroma meter. The Traffic Administration Office has this equipment and should be contacted to discuss the necessity of this test.

26.6 PAVEMENT MARKINGS

26.6.1 Placement Considerations

Permanent pavement markings are one of the last items to be installed on most contracts. They are usually installed in the later part of the year, when temperatures begin to fall. It is important to monitor temperature and pavement surface conditions in advance of permanent pavement marking placement. Temporary markings may be required until weather conditions improve. The potential for contract time extensions for pavement marking issues should be discussed with the AE.

The PEMS should also remember that pavement surfaces must be visibly dry, in accordance with the SS, for any marking material to be successfully applied. The Contractor may also need to perform a pavement moisture test (ASTM D1461) to verify.

Permanent markings are required to follow the widths indicated within the SS and contract plans. Normally, center lines, lane lines, and edge lines should be 6 in. wide for state highways and 4 in. on all other roads.

26.6.2 Durable Markings

Substitution of durable markings for other pavement marking materials should only be performed after consultation with the DTE. The DTE should be consulted before a change of marking material is accepted.

Alternatives that may be substituted for durable markings in late season, cold weather conditions include, but are not limited to, polyurea, methyl methacrylate (MMA), low temperature waterborne paint, cold weather thermoplastic. Price adjustments, either up (polyurea or MMA) or down (paint), may be required with any substitute material. Reference should be made to the SS for low temperature limits for permanent pavement markings. The DTE may also be contacted for additional questions and concerns.

Consideration may also be given to installing temporary markings (paint, type I tape, 40 mil thermoplastic) and postponing the installation of the permanent markings until weather conditions are more acceptable.

26.6.3 Groove Depth and Wet Reflective Elements

In accordance with the SS, all durable markings placed for center lines, lane lines, or edge lines are installed in a groove milled into the pavement surface. This process helps protect the Department's investment by significantly reducing the possibility of the durable marking receiving damage due to snow plowing. It is necessary to mill the groove deep enough to completely recess the marking material. The groove should not be milled too deep and prevent the wet reflective elements from performing as intended. Water depth over the wet reflective elements alters how light is reflected off the marking. This change in reflection does not allow the markings to be seen properly by the driver and greatly reduces their effectiveness. The Contractor must utilize installation crews properly trained in milling the grooves for wet reflective markings. In accordance with the SS, the maximum allowable depth for grooving is 150 mils (slightly under 5/32 of an inch). Diamond gang saw blades are recommended for the grooving operation to achieve the proper width and depth in a single pass.

Where pavement markings are grooved, in accordance with the SS, the minimum cure time for joint sealant is not applicable.

26.6.4 Pavement Corrugations, Rumble Strips, and Rumble Stripes

On roadways other than interstates, a 20 ft gap for every 80 ft of shoulder corrugation or edge line rumble stripe must be provided. PCCP roadway shoulders are required to have four continuous pavement panels with corrugations followed by one panel without. Refer to the Standard Drawings for Pavement Corrugations, Rumble Strips, and Rumble Stripes. The Standard Drawings indicate additional gap requirements for shoulder corrugations and edge line rumble strips at turn lanes, intersections, railroads, and bridge decks. Errors in the installation of shoulder

corrugations and edge line rumble strips are difficult to correct and often involve replacing or adding pavement.

Pavement corrugations, when used for center line rumble stripes, must be gapped for raised pavement markers. Normally, raised pavement markers will be placed after pavement corrugations have been installed. The PEMS must verify the gaps for raised pavement markings are laid out before installing the center line rumble stripe.

26.7 AS-BUILT DRAWING SUBMITTALS

Within 30 calendar days after completion of the work, the Contractor is required to submit as-built drawings, in electronic format, to the Engineer. Signal as-built drawings must indicate the as-built location of steel strain poles, signal cantilevers, service points, controller cabinet, loop detectors, conduit runs, and signal handholes. Lighting as-built drawings are required to indicate the as-built location of light poles, high mast towers, service points, conduit runs, and lighting handholes.

26.8 HIGH FRICTION SURFACE TREATMENTS *(add. 12-01-25)*

High friction surface treatment, HFST, is used on either asphalt or concrete pavement surfaces to enhance skid resistance. The higher pavement friction helps motorists maintain better control in both dry and wet driving conditions, to reduce roadway departure crashes and improve safety. It is produced using a calcined bauxite aggregate bound with a polymeric resin.

The Contractor is required to submit a QCP to the PEMS 14 days prior to the HFST application. The QCP is subject to acceptance by the PEMS. The QCP is required to indicate the proposed methods to control the equipment, materials, mixing, and paving operations to ensure conformance with the requirements within RSP 617-T-213. Certifications for the materials are described within the RSP.

The HFST is required to be applied utilizing a truck mounted application machine. The equipment must be capable of applying the binder and aggregate at a minimum continuous rate of 2,300 sq yd/hr. Polymer mixing and distribution equipment and aggregate distribution equipment must comply with the requirements of RSP 617-T-213.

The HFST materials are not to be placed when rain is forecast during the material application or curing. No moisture should be present on the surface of the pavement at the time of application. A plastic sheet, 18 in. by 18 in. taped in place for a minimum of two hours and up to sixteen hours, in accordance with ASTM D4263, is used to identify moisture on the pavement. An electrical impedance meter that meets ASTM F2659 may also be used to check surface moisture. A test section, described in RSP 617-T-213, is required to be constructed within the contract to demonstrate the truck mounted application machine has been properly calibrated.

After the pre-construction conference, the PEMS must notify the Department's Research and Development section of the project schedule and provide contact info for the Contractor so that friction testing can be conducted within the testing window, described within RSP 617-T-213, after installation.

If the Department's Research and Development section is unable to perform the friction testing or where there is a particular concern about delamination at one or more locations on the project, mean profile depth testing should be conducted to complete the acceptance testing.