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Part 13 - APPENDIX

1300 GENERAL

This Part will be used to provide additional or supplementary material that may be useful for those using this Manual. Copies of separate policies, guidelines and standard operating procedures referenced in other sections are included herein.

1301 DEFINITIONS

1301-1 General

Generally, for traffic control purposes, the definitions found in the **OMUTCD** will apply. Also, for design purposes, there are additional definitions provided in the three volumes of the **L&D Manual**. Additional definitions, including explanations of various acronyms, have been provided in this section. For the convenience of the **TEM** users, some definitions found in the **L&D Manual** have been included; however, definitions found in the **OMUTCD** have not been repeated unless there is a difference noted between the way the term is used for traffic control purposes versus design purposes.

1301-2 Acronyms and Abbreviations

Some of these acronyms and abbreviations may not be used in the **TEM** at this time; however, they are provided here as a convenience since they may appear in other related references.

AAN - **American Association of Nurserymen**.

AASHTO - **American Association of State Highway and Transportation Officials**.

ACI - **American Concrete Institute**.

ADA - **Americans with Disabilities Act**.

AISC - **American Institute of Steel Construction**.

AISI - **American Iron and Steel Institute**.

ANSI - **American National Standards Institute**.

AREA - **American Railway Engineering Association**.

ASCE - **American Society of Civil Engineers**.

ASM - **Application Standards Manual**. A manual previously published by **OTE** which was incorporated into the **TEM**.

ASME - **American Society of Mechanical Engineers**.

ASTM - **American Society of Testing and Materials**.

ATSSA - **American Traffic Safety Services Association**.

AWG - **American Wire Gauge**.

AWS - **American Welding Society**.

AWWA - **American Water Works Association**.

AWPA - **American Wood Preservers' Association**.

CGM - **Construction Guidelines Manual**. A manual which was previously published by **OTE** which was incorporated into the **TEM**.

DDD - **ODOT District Deputy Director**.

CADD - Computer-Aided Drafting and Design. See ***Section 1301-3*** for additional information.

CMS - **Construction and Materials Specifications Book**. See ***Part 1*** for additional informaiton.

EEI - **Edison Electric Institute**.

EPA - **Environmental Protection Agency**.

FHWA - **Federal Highway Administration, Department of Transportation**.

FSS - **Federal Specifications and Standards** from the **General Services Administration**.

GLCT - Great Lakes Circle Tour. See ***Part 2*** for additional information.

GSDM - **Guide Sign Design Manual (also known as the Design Manual for Directional Guide Signs)**. A manual previously published by **OTE**. The information is now located in Appendix C of the **Sign Design Manual**, which is incorporated by reference into the **TEM**.

HCM - **Highway Capacity Manual**.

IEEE - **Institute of Electrical and Electronic Engineers**.

IES - **Illuminating Engineering Society**.

IMSA - **International Municipal Signal Association**.

IPCEA - **Insulated Power Cable Engineers Association.**

ISSA - **International Slurry Seal Association.**

ITS America - Intelligent Transportation Society of America

ITE - **Institute of Transportation Engineers**.

L&D Manual - **Location and Design Manual**. A three-volume set of design manuals published by the **Office of Roadway Engineering Services** (Volume One), the **Office of Structural Engineering** (Volume Two) and the **Office of Production** (Volume Three).

LECT - Lake Erie Circle Tour. See ***Part 2*** for additional information.

LOS - **Level of Service**. See ***Section 1301-3*** and the **L&D Manual Volume One**, for additional information.

L.C.L. - **Light Center Length**. See ***Section 1301-3*** for additional information.

LEO - **Law Enforcement Officer**.

LPA - **Local Public Agency**.

LTAP - **Local Transportation Assistance Program**. See ***Section 1301-3*** for additional information.

MUTCD - **Manual on Uniform Traffic Control Devices**. This manual, published by **FHWA**, is described in ***Section 193-10***.

NCUTCD - **National Committee on Uniform Traffic Control Devices**. See ***Section 1301-3*** for additional information.

NEMA - **National Electrical Manufacturers Association**. See ***Section 1301-3*** for additional information.

OCA - **Office of Construction Administration**.

ODNR - **Ohio Department of Natural Resources**.

ODOT - **Ohio Department of Transportation**.

OMUTCD - **Ohio Manual of Uniform Traffic Control Devices**. See ***Section 101*** for additional information.

OPI - **Ohio Penal Industries**.

ORC - **Ohio Revised Code**.

ORDC - **Ohio Rail Development Commission**.

OSHA - **Occupational Safety and Health Administration**.

OTE - **Office of Traffic Engineering**.

O.L. - Overall Length. See ***Section 1301-3*** for additional information.

PIS - Plan Insert Sheets. See ***Section 104*** for additional information.

PS&E - Plans, Specifications & Estimates. See ***Section 1301-3*** for additional information.

RAM - Random Access Memory. See ***Section 1301-3*** for additional information.

REA - **Rural Electrification Administration**

ROM - Read Only Memory. See ***Section 1301-3*** for additional information.

RPM - Raised Pavement Marker. See ***Section 1301-3*** for additional information.

SCD - Standard Construction Drawing. See ***Section 1301-3*** for additional information.

SDM - **Sign Design Manual**. The **Standard Sign Design Manual** is described in ***Section 295-2***.

SHS - **Standard Highway Signs**. This manual, published by **FHWA**, is described in ***Section 193-15***.

SOP - Standard Operating Procedure.

SSPC - **Steel Structures Painting Council**.

SLD - Straight Line Distance. See ***Section 1301-3*** for additional information.

SLM - Straight Line Mileage. See ***Section 1301-3*** for additional information.

TCD - Traffic Control Device.

TCDIM - **Traffic Control Design Information Manual**. A manual previously published by **OTE** which has been incorporated into the **TEM**.

TCP - Traffic Control Plan.

TEM - **Traffic Engineering Manual**.

TODS - Tourist Oriented Directional Signs. See ***Section 1301-3*** and ***Part 2*** for additional information.

TRPM - Temporary Raised Pavement Marker.

UL - **Underwriters' Laboratories, Inc.**

1301-3 Words and Phrases

OMUTCD Section 1A.13 defines various terms used in that manual and herein. When the source of the definition is the **ORC** (usually **Section 4511.01**), the definition is shown in italics and the **ORC** section number is noted. The following list is intended to provide definitions of words and phrases not currently defined in the **OMUTCD**.

Some of the definitions in this section will be incorporated into the **OMUTCD**; however, most of them are more detailed than needed for the **OMUTCD**. The source for most of these definitions was the **Construction Guidelines Manual**, previously published by **OTE** and now incorporated into the **TEM**. When definitions have been taken from other sources, such as the national **Manual on Uniform Traffic Control Devices (MUTCD)** and the **ODOT L&D Manuals**, they have been identified by a cross-reference.

Also, some of the terms noted herein may have different meanings depending on the context in which they are used. Clarification has been provided as needed.

Adaptation - The process by which the retina becomes accustomed to more or less light than it was exposed to during an immediately preceding period.

Adjustable Signal - A signal head having the signal faces mounted in the support hardware so that each face may be adjusted or "aimed," as required to present the indication to approaching traffic.

Alternate Bid - A bid process in which both a generic bid and a proprietary bid are taken for the same item of equipment or work. The maintaining agency may choose which bid to accept; however, if the agency chooses the proprietary bid and it is higher than the generic bid, it must use its own funds for 100 percent of the cost difference.

Amplifier - A device that is capable of intensifying the electrical energy produced by a sensor.

Analog Controller - A controller with a method of timing that measures continuous variables such as voltage or current.

Arterial Highway (or Street) - For traffic engineering purposes **(ORC 4511.01 and OMUTCD)**, any U.S. or State numbered route, controlled-access highway, or other major radial or circumferential street or highway designated by local authorities within their respective jurisdictions as part of a major arterial system of streets or highways.

For design purposes, a functional classification for a facility primarily used for through traffic, usually on a continuous route **(L&D Manual Volume One)**.

Attenuator (Crash Cushion) - Protective device that prevents errant vehicles from impacting a fixed object by gradually decelerating or redirecting the vehicle **(L&D Manual Volume One)**.

Auto-Manual Switch - See **Switch, Auto-Manual**.

Auxiliary Equipment - Separate control devices used to add supplementary features to a signal controller.

Balance Adjuster - A device used to permit alignment of the point of suspension with respect to the center of gravity of the signal head so that the signal will hang vertically.

Ballast - An auxiliary device used with vapor lamps, on multiple circuits, to provide proper operating characteristics. It limits the current through the lamp, and may also transform voltage.

Ballast Mounting - Ballast shall be mounted within the luminaire housing (integral).

Bandwidth - The amount of green time available to a platoon of vehicles in a progressive signal system. This is also referred to as through band.

Barrier - A longitudinal device used to shield drivers from natural or manmade obstacles along the roadway. Occasionally used to protect others (pedestrian, bicyclists, etc.) from vehicular traffic **(L&D Manual Volume One)**.

Barrier (Compatibility Line) - A reference point in the preferred sequence of a multi-ring controller unit at which all rings are interlocked. Barriers assure three will be no concurrent selection and timing of conflicting phases for traffic movement in different rings. All rings cross the barrier simultaneously to select and time phases on the other side (NEMA).

Barrier Clearance - The distance required between the face of a barrier and the face of an obstacle to permit adequate shielding **(L&D Manual Volume One)**.

Barrier Curb - See Curb, Vertical.

Base Plates - In sign support breakaway connections, plates welded onto each beam half with skewed notches for torqued bolts so as to permit the plates to part under vehicle impact.

Bead Flotation - The ability of glass beads to assume a hemispheric secured position when dispensed onto the surface of the freshly applied pavement markings.

Beam Candlepower - The intensity of a beam forming light source expressed in candelas measured in a given direction.

Beam Spread - The angle between the two directions in the plane in which candlepower is equal to a stated percent (usually 10 percent) of maximum candlepower in the beam.

Beam-Type Support - See **Support, Beam-Type**.

Bearing Plate - A formed steel plate installed between a flatsheet sign and its mounting post so as to reinforce the sign.

Bid, Alternate - See **Alternate Bid**.

Bid, Generic - See **Generic Bid**.

Bid, Proprietary - See **Proprietary Bid**.

Binder - Resins and liquids used to combine dry ingredients into a formulation of pavement marking materials.

Bleeding - A condition where asphalt pavement surfaces soften to a point where released oils appear as strains in the marking.

Bracket Arm - A signal bracket, for bracket-mount applications, of tubular construction through which wiring can be passed to provide electrical connection of the signal faces.

Breakaway Beam-Type Support - See **Support, Breakaway Beam-Type**.

Burning position - Physical positioning of the lamp in the traffic signal. Normally, traffic signal lamps are used in horizontal burning position.

Cable - A group of separately insulated wires in a common jacket.

Cable Entrance Adapter - A device of tubular construction which is used between the span wire hanger and the traffic signal to provide for passing signal cable into the head.

CADD (Computer-Aided Drafting and Design) - The preferred method of preparing construction plans for the **ODOT**. **ODOT** has adopted MicroStation as its standard CADD software package and has developed various CADD standards to ensure plan uniformity.

Call - A registration of demand for right-of-way by traffic (vehicular or pedestrian) at a signal controller.

Calling Detector - A detector that is installed in a selected location to detect vehicles which may not otherwise be detected, and whose output may be modified by the controller unit.

Calling Relay - A detector relay which will allow a detector actuation to be transferred to the controller only when certain signal displays are occurring.

Camber - An upward curve in horizontal structural members so that when erected and under dead weight a horizontal position or slightly upward curve will result.

Camshaft - A device consisting of a stack of programmed cams operated by a drive motor for intermittent advancement in increments to cause contacts to open or close, thus causing the required signals to be energized.

Candela (cd) - The unit of luminous intensity; one candela is defined as the luminous intensity of 1/60th of one square centimeter of projected area of a blackbody radiator operating at the temperature of solidification of platinum.

Candlepower - Luminous intensity expressed in candelas.

Cantilever Support - See **Support, Cantilever**.

Carryover (Extended) Output - The ability of a detector to continue its output for a predetermined length of time following an actuation.

Catch Basin - A structure for intercepting flow from a gutter or ditch and discharging the water through a conduit **(L&D Manual Volume Two)**.

Centerline of Construction - The reference line used for construction of a project. Normally located at the median centerline on a divided highway or at the normal crown point location on an undivided highway **(L&D Manual Volume Three)**.

Centerline of Right-of-Way - The reference line used for the right-of-way of a project. Normally located at the center of a highway's existing right-of-way **(L&D Manual Volume Three)**.

Centerline of Survey - The reference line used in the field survey of a project. Although it is usually the same as the centerline of construction, it may be a separate survey line established for convenience. With modern surveying instruments, surveys are no longer completed based on a centerline of survey **(L&D Manual Volume Three)**.

Center-Mount Support - See **Support, Center-Mount**.

Centralized Control Signal System - A system in which all control functions are controlled by a computer with direct communication to each local intersection controller without using the intermediate control and processing of a master controller.

City - A municipal corporation having a population of 5,000 or more persons **(ORC Section 703.1)**.

Classification Detector - A detector that has the capability of differentiating among types of vehicles.

Clear Zone - The area along a highway beyond the edge of pavement and available for safe use by errant vehicles **(L&D Manual Volume One)**.

The total roadside border area, starting at the edge of the traveled way, that is wide enough to allow an errant driver to stop or regain control of a vehicle. This area might consist of a shoulder, a recoverable slope, and/or a nonrecoverable, traversable slope with a clear run-out area at its toe **(OMUTCD)**.

Cloverleaf Interchange - An interchange with loop ramps and outer ramps for directional movements. A full cloverleaf has ramps in every quadrant **(L&D Manual Volume One)**.

Collector Highway (or Street) - A functional classification for a facility in an intermediate

functional category connecting smaller local road or street systems with larger arterial systems **(L&D Manual Volume One)**.

A term denoting a highway that in rural areas connects small towns and local highways to arterial highways, and in urban areas provides land access and traffic circulation within residential, commercial and business areas and connects local highways to the arterial highways **(OMUTCD)**.

Coefficient of Utilization (CU) - Ratio of luminous flux (lumens) received on the work area to the rated lumens emitted by the lamp.

Collector-Distributor (C-D) - A directional roadway adjacent to a freeway used to reduce the number of conflicts (merging, diverging and weaving) on the mainline facility **(L&D Manual Volume One)**.

Commercial Activity - For purposes of defining Tourist Oriented Activity for the TODS program, this is defined as a farm market, winery, a bed and breakfast, lodging that is not a franchise or part of a national chain, antiques shop, craft store, or gift store.

Computed Initial Portion (Added Initial Portion, Variable Initial Portion) - An initial portion which is added to the minimum actuations on volume density timed controllers.

Computer - A device capable of accepting information, applying prescribed processes to the information and supplying results of these processes. It usually consists of input and output devices, storage, arithmetic and logic units, and a control unit.

Computer Program - A series of instruction or statements in a form acceptable to the computer which will achieve a certain result.

Concurrent timing - See **Dual-ring Controller**.

Conduit - An artificial or natural channel; usually a closed structure such as a pipe **(L&D Manual Volume Two)**.

Condulet - A fitting connected to solid or flexible electrical conduit to direct the routing path and containing a removable cover for wire pulling.

Conflicting Phases - Two or more signal phases which will cause interfering, or conflicting, traffic movements if operated concurrently.

Congestion Detection - A system of hardware and software designed and operated to provide data on the level of traffic congestion in the area being detected.

Contact, Signal Circuit - A device arranged to energize or de-energize signal light circuits during a specified interval.

Continuous Presence Mode - Detector outputs continue if any vehicle (first or last remaining) remains in the field of influence.

Controller (Controller Assembly) - A complete electrical or electronic device mounted in a cabinet for controlling the operation of a traffic signal **(OMUTCD)**.

Controller, Local Intersection - See **Local Intersection Controller**.

Controller, Master - See **Master Controller**.

Controller, Traffic-Actuated - See **Traffic-Actuated Controller**.

Construction Limits - Lines shown on a plan view that outline the lateral extent of the work. Typically placed 4 feet (1.2 meters) outside the point where the backslope touches the existing ground unless additional room is required for construction activities **(L&D Manual Volume Three)**.

Controlled Access - Highway right-of-way where preference is given to through traffic. In addition to access connections with selected public roads, there may be some private drive connections **(L&D Manual Volume One)**.

Controlled-Access Highway (Partial Control of Access) - Every highway, street or roadway in respect to which owners or occupants of abutting lands and other persons have no legal right of access to or from the same except at such points only and in such manner as may be determined by the public authority having jurisdiction over such highway, street or roadway **(ORC 4511.01 and OMUTCD)**.

Converging Roadway - Separate and nearly parallel roadways or ramps which combine into a single continuous roadway or ramp having a greater number of lanes beyond the nose than the number of lanes on either approach roadways **(L&D Manual Volume One)**.

Coordinator (Coordination Unit) - A device used to interrelate the timing of one controller to others in a traffic signal system.

Coordination - See **Signal Coordination**.

Crash Cushion - See **Attenuator**.

Crashworthy - A characteristic of a roadside appurtenance that has been successfully crash tested in accordance with a national standard such as the National Cooperative Highway Research Program Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features" **(MUTCD)**.

Culvert - A structure, as distinguished from a bridge, which is usually covered with embankment and is composed of structural material around the entire perimeter, although some are supported on spread footings with the streambed serving as the bottom of the culvert. Also, a structure which is 20 feet (6.1meters) or less in roadway centerline length between extreme ends of openings for multiple cell structures **(L&D Manual Volume Two)**.

Curb, Sloping - Sloping curbs are designed so vehicles can cross them readily when the need arises. They are low with flat sloping faces. Total curb height should not exceed 6 inches (150 millimeters). Formerly called Mountable Curb **(AASHTO)**.

Curb, Vertical - Vertical curbs may be either vertical or nearly vertical and are intended to discourage vehicles from leaving the roadway. The curb height ranges from 6 to 8 inches (150 to 200 millimeters). Formerly called Barrier Curb **(AASHTO)**.

Cycle - Any complete sequence of signal indications.

Cycle Selection Switch - A device which when operated discontinues automatic selection of cycle unit with associated split(s) and offset(s) and permits manual selection of another cycle unit.

Daylight Reflectance - The measure of daylight reflected from a pavement marking for the enhancement of visibility.

Decoder - A mechanism for translating a code into its various components.

Decision Sight Distance - The distance required for a driver to detect an unexpected or otherwise difficult-to-perceive information source or hazard in a roadway environment that may be visually cluttered, recognize the hazard or its threat potential, select an appropriate speed and path, and initiate and complete the required maneuver safely **(L&D Manual Volume One)**.

Dedicated Lines - Communication lines used solely to interconnect two or more intersections.

Delayed Output - The ability of a detector to delay its output for a predetermined length of time during an extended actuation.

Delay Relay - A detector relay which will provide an actuation only after the relay has been continuously energized for a set period of time.

Delineator - A retroreflective device mounted on the roadway surface or at the side of the roadway in a series to indicate the alignment of the roadway, especially at night or in adverse weather **(MUTCD)**.

Demand - The need for service, e.g., the number of vehicles desiring to use a given segment of roadway during a specified unit of time.

Demountable Copy - Sign copy made up of separate letters, digits, symbols, shields and border sections which are riveted or bolted to the sign panel and which may be readily removed.

Density - A measure of the number of vehicles per unit length of roadway; a measure of the concentration of vehicles usually stated as the number of vehicles per mile (kilometer) per lane.

Department - The **Ohio Department of Transportation**.

Design Exception - A document which explains the engineering reasons for allowing certain design criteria to be relaxed in extreme unusual circumstances **(L&D Manual Volume One)**.

Design Hour - The 30th highest hourly volume of the design year **(L&D Manual Volume One)**.

Design Hourly Volume - The total volume of traffic in the design hour, usually a forecast of peak hour volume, measured in vehicles per hour **(L&D Manual Volume One)**.

Design Speed - The maximum safe speed that can be maintained over a specified section of highway when conditions are so favorable that the design features of the highway govern **(L&D Manual Volume One)**.

Destination Signs - Signs providing distance and/or directional information to a city, village or other objective.

Detectable - Having a continuous edge within 150 mm (6 in) of the surface so that pedestrians who have visual disabilities can sense its presence and receive usable guidance information **(MUTCD)**.

Detections - The process used to identify the presence or passage of vehicles at a specific point or to identify the presence of one or more vehicles in a specific area.

Detector Modes - A term used to describe the duration of detector output when a detection occurs.

Diagnostic - (1) Pertaining to the detection, discovery and further isolation of a malfunction or mistake; (2) A program that facilitates computer maintenance by detection and isolation of malfunctions or mistakes.

Diamond Interchange - The simplest and most common type of interchange, formed when one-way diagonal ramps are provided in each quadrant and left turns are provided on the minor highway **(L&D Manual Volume One)**.

Diffuser - A device to redirect or scatter the light from a source, primarily by the process of diffuse transmission.

Digital Controller - A controller wherein timing is based upon a defined frequency source such as a 60-hertz alternating power source.

Digital Timing - See **Timing, Digital**.

Dilemma Zone - The range of distances from the Stop Line within which drivers are indecisive as to whether to stop or proceed through the intersection when the traffic signal indication changes from green to yellow. Distances are dependent upon travel speed.

Directional Interchange - An interchange, generally having more than one grade separation, with direct connections for all movements **(L&D Manual Volume One)**.

Direct Applied Copy - Sign copy cut from sheeting material and applied to the sign surface by a coated adhesive.

Direct Glare - Glare resulting from high brightnesses or insufficiently shielded light sources in the field of view or from reflecting areas of high brightness.

Direct Wire - A communications medium which uses hardware interconnect between the transmission and reception points.

Directional Detector (or Relay) - A detector that is capable of being actuated only by vehicles proceeding in one specified direction.

Directional Relay - A relay connected with detectors and designed to actuate only when traffic has crossed the detectors in a certain direction.

Disability Glare - Glare which reduces visual performance and visibility and which is often accompanied by discomfort.

Discomfort Glare - Glare which produces discomfort. It does not necessarily interfere with visual performance or visibility.

Disconnect Hanger - A mounting device for quick detachment or attachment of a signal head.

Distributed Control Signal System - A system in which all control functions are controlled by a master controller which is connected to all local intersections under its control. The master controller is typically located at an on-street location near the local intersection it controls. The master controller is connected to a computer to enable an operator to control, monitor and produce reports from each master controller database.

Divergence Angle - The angle at a reflective surface between a light ray striking the surface and an observer's line of sight.

Diverging Roadway - Where a roadway branches or forks into two separate roadways without the use of a speed change lane **(L&D Manual Volume One)**.

Down Time - The time during which a device is unavailable for normal operation.

Drop-on Beads (Surface Applied Beads) - Glass beads dispensed concurrently with wet or molten marking material placement so that the beads are held on the surface to provide instantaneous reflectorization.

Dual Entry - See **Entry, Dual**.

Dual-ring Controller - A controller containing two interlocked rings which are arranged to time a preferred sequence and to allow concurrent timing of both rings, subject to the restraint in the Barrier (Compatibility Line).

Dummy Interval - A redundant interval in the cam switching mechanism incorporated so as to allow the total number of intervals in the cycle to correspond integrally with the total number of intervals provided on the cam switching mechanism.

Dwell - See **Rest**.

Edge of Pavement - See **Pavement Edge**.

Electromechanical Controller - A controller which is characterized by electrical circuits using relays, step switches, motors, etc.

Electromechanical Electronic Controller - A controller combining electromechanical components and electronic timing circuits comprised of vacuum electronic tubes, resistors, capacitors and inductors, etc.

Emergency-Traffic Signal - A special adaptation of a traffic control signal to obtain the right-of-way for an authorized emergency vehicle.

Encoder - A device which converts data into a form for transmission over the communication link between two points in a system.

Entrance Ramp Approach Signs - Signs at a freeway or expressway interchange providing state route identification and directional information.

Entry, Dual - A mode of operation (in a dual-ring controller) in which one phase in each ring must be in service. If a call does not exist in a ring when it crosses the barrier, a phase is selected in that ring to be activated by the controller in a predetermined manner.

Entry, Single - A mode of operation (in a dual-ring controller) in which a phase in one ring can be selected and timed alone if there is no demand for service in a non-conflicting phase on a parallel ring.

Epoxy Markings - A mixture of epoxy resin and polymeric curing agent blended in a nozzle and spray applied to the pavement.

Expressway - For purposes of the traffic control standards **(ORC 4511.01 and OMUTCD)**, “a divided, arterial highway for through traffic with full or partial control of access with an excess of fifty percent of all crossroads separated in grade.”

For design purposes **(L&D Manual Volume One)**, "a divided, arterial highway with full or partial control of access and generally with grade separations at major intersections."

Extendible Portion (Extensible Portion) - That portion of the green interval on an actuated phase following the initial portion which may be extended by traffic actuations.

Extension Detector - A detector that is arranged to register actuation at the controller only during the green interval for that approach so as to extend the green time of the actuating vehicles.

Extension Interval (Gap) - The timing interval during the extendible portion which is resettable by each detector actuation. The green right-of-way of the phase may terminate on expiration of the unit extension time.

Extension Limit - See **Limit, Extension**.

Extruded Markings - Pavement markings applied in a plastic state by means of a shaping die.

Extrusheet Sign - See **Sign, Extrusheet**.

Field Terminal Blocks - See **Terminal Blocks, Field**.

Filament - The electrical resistance element heated to incandescence by electric current.

Fill Slope - See **Foreslope**.

Filler - An ingredient adding bulk to the formulations of pavement marking materials.

Flash Control Switch - See **Switch, Flash Control**.

Flasher Controller - A complete electrical mechanism with cabinet for flashing a traffic signal or beacon.

Flatsheet Sign - See **Sign, Flatsheet**.

Footcandle (fc) - The unit of illumination when the foot is the unit of length; the illumination on a surface one square foot in area on which there is a uniformly distributed flux of one lumen. It equals one lumen per square foot.

Footlambert (fl) - The unit of brightness equal to the uniform brightness of a perfectly diffusing surface emitting or reflecting light at the rate of one lumen per square foot. On a roadway, it equals the illumination in footcandles multiplied by the reflection factor of the surface.

Force Account - The direct performance of highway construction work by a highway agency, a railroad company or a public utility company by use of labor, equipment, materials and supplies furnished by them and used under their direct control.

For a construction project, force account is defined as a basis of payment for the direct performance of highway construction work with payment based on the actual cost of labor, equipment and materials furnished.

Force Off - A command to the controller that will force the termination of the current right-of-way interval during the extendible portion.

Force Skip - See **Omit, Phase**.

Foreslope - The slope from the edge of the graded shoulder to the bottom of the ditch. Also, called Fill Slope **(L&D Manual Volume One)**.

Freeway - For traffic control purposes **(ORC 4511.01 and OMUTCD)**, "a divided multi-lane highway for through traffic with all crossroads separated in grade and with full control of access."

For design purposes **(L&D Manual Volume One)**, "an expressway with full access control and no at-grade intersections."

Full-Actuated Controller - A type of actuated controller in which means are provided for traffic actuation on all approaches to the intersection.

Full-circle Tunnel Visor - A visor which encircles the entire lens.

Functional Classification - The grouping of highways by the character of service they provide **(L&D Manual Volume One)**.

Fuse Plate - See **Plate, Fuse**.

Gap, Maximum - The maximum time on volume-density timed controllers allotted for vehicles to proceed through the intersection. The interval portion is decreased to a fixed minimum in proportion to traffic demands.

Gap, Minimum - The lower limit to which the extendible portion of the extension time may be decreased on volume-density timed controllers.

Gap Reduction - A feature in volume-density controllers whereby the unit extension in the phase having the green is reduced in the extendible portion of the interval in proportion to the time vehicles have waited on the phase(s) having the red.

General Notes - A portion of a highway plan containing those plan notes required to clarify construction items not adequately covered by the specifications or plan details **(L&D Manual Volume Three)**.

General Summary - A portion of a highway plan used to summarize the total estimated quantities with complete pay item descriptions, item numbers and funding splits **(L&D Manual Volume Three)**.

Generic (or Generic Bid) - Specified by a generalized material or performance specification without reference to a manufacturer's brand name or registered trademark.

Generic Motorist Service Signing - Symbolic or word message signs shown in the **OMUTCD** which indicate the type of service, but not the specific name of the facility.

Glare - The sensation produced by brightnesses within the visual field that are sufficiently greater than the luminance to which the eyes are adapted to cause annoyance, discomfort, or loss in visual performance and visibility.

Glare Screen - A device used to reduce the amount of headlight glare resulting from opposing traffic **(L&D Manual Volume One)**.

Glare Shield - A nonreflective vertical extension of a sign designed to mask the direct rays of sign lighting fixtures from the eyes of drivers approaching on the opposing roadway.

Glass Beads - Small spheres which, when exposed on a pavement marking surface, act as refracting and reflecting elements which return light back to its source.

Glint - The reflection of light from a specular surface.

Gradation - The classification of particle size distribution of dry material as determined by the passage or retention of portions of a specimen on standard sieves.

Graded Shoulder - The area located between the edge of the pavement and the foreslope **(L&D Manual Volume One)**.

Green Interval (Right-of-way) - The operation of a controller in causing traffic signals to display indications permitting vehicles or pedestrians to proceed in a lawful manner in preference to other vehicles or pedestrians.

Ground-Mounted Support - See **Support, Ground-Mounted**.

Headlight Sight Distance - The stopping sight distance required on an unlighted sag vertical curve **(L&D Manual Volume One)**.

Headwall - The structural appurtenance placed at the end of a culvert to control an adjacent highway embankment and protect the culvert end from undercutting **(L&D Manual Volume Two)**.

Hiding Power - The degree of opaqueness of a marking in masking underlying pavement shades.

Hinge Plate - See **Plate, Hinge**.

Hold - A command to the signal controller which causes it to retain the existing right-of-way interval.

Horizontal Sight Distance - The sight distance available in consideration of various horizontal alignment features, such as, degree of curvature and the horizontal distance to roadside obstructions **(L&D Manual Volume One)**.

Hybrid Control Signal System - Incorporates features of both the Centralized and Distributed Control Signal Systems.

Illumination (Illuminance) (E) - The density of luminous flux incident on a surface; the quotient of the flux divided by the area of the surface, when the flux is uniformly distributed.

Impact Resistance - The toughness of a material in resisting deformation and fracture due to a striking blow.

Indicator Lights - Visual aides showing actuations and timing of intervals or phases on a controller for the purpose of programming inspection and maintenance.

Inherently Low Emission Vehicle (ILEV) - Any kind of vehicle that is certified by the U.S. Environmental Protection Agency and that because of inherent properties of the fuel system design, will not have significant evaporative emissions, even if its evaporative emission control system has failed.

Initial Portion - The first timed portion of the green interval in an actuated controller.

Inlaid Markings - Markings of preformed material pressed into the surface of newly placed asphalt concrete pavement.

In-mixed Beads (Premixed Beads) - Glass beads distributed uniformly through a pavement marking material to provide continuous reflectorization as the material wears away.

Interconnect - The traffic signal communication network connecting the system master with local intersection controllers.

Interconnected Controller - A controller which operates traffic signals under the supervision of a master controller.

Interface - A common boundary at which two separate systems or portions of each join or interact. An interface can be mechanical, as in adjoining hardware surfaces, or it can be electrical, as in signal level transformation points. Moreover, it can also refer to human and machine interface and the interaction between man and computer.

Interlock - A feature of electromechanical controllers which maintains the timing dial in step with the camshaft.

Intersection Sight Distance - The distance needed along the main roadway for a car entering from a cross road to make a left turn onto the main roadway while clearing traffic approaching from the left **(L&D Manual Volume One and TEM Part 2)**.

Interstate - Those roadways on the Federal System which have the highest design speeds and the most stringent design standards **(L&D Manual Volume One)**.

Interval Sequence - The order of appearance of signal indications during successive intervals of a cycle.

Interval Sequence Chart - A chart designating the order in which the phases of a cycle occur and the associated signal display for each interval.

Item Code - A nine-digit character used to catalogue pay item descriptions **(L&D Manual Volume Three)**.

Item Master - A list of acceptable item codes and their corresponding pay item descriptions and units of measure **(L&D Manual Volume Three)**.

Jack - A receptacle in a controller cabinet in which a plug-in device may be inserted.

Lamp - The part of the optical unit which, when energized electrically, provides the optical unit light source.

Lamp Lumen Depreciation Factor (LLD) - The multiplier to be used in illumination calculations to relate the initial rated output of light sources to the anticipated minimum rated output based on the relamping program to be used.

Lateral Clearance - The distance measured horizontally from the edge of pavement to the face of an object (parapet, abutment, pier, wall, etc.) **(L&D Manual Volume One)**.

Lead-in Cable - The electric cable which serves to connect the sensor to the input of the detector unit.

Legal Speed - The legislated or agency authorized maximum speed limit on a section of roadway **(L&D Manual Volume One)**.

Legend - Word messages or symbols used on signs to cover specific meanings.

Lens - That part of the optical unit through which light from the light source and reflector passes, and in so doing, is redirected into a prescribed pattern and is filtered to a prescribed color.

Level of Service (LOS) - A qualitative measure describing the operational flow of traffic **(L&D Manual Volume One)**.

Light - A form of radiant energy (such as emitted by the sun). For purpose of illuminating engineering, the energy is evaluated according to its capacity to produce visual sensations. Measurements are based upon a unit of luminous intensity equal to the light emitted by a "standard candle" in a horizontal direction.

Light Center Length (L.C.L.) - The dimension, in inches (millimeters) from the center of the filament to the top of the base (including solder on the base eyelet).

Light Sensitive Detector - A detector that uses a light-sensitive device for sensing the passage of an object interrupting a beam of light directed at the sensor.

Lighting Pole - A support provided with necessary internal attachments for wiring and external attachments for bracket and luminaire.

Limit, Extension - The maximum time of the extendible portion for which actuations on any traffic phase may retain the right-of-way after actuation on an opposing traffic phase.

Limit, Maximum - The maximum green time after an opposing actuation, which may start in the initial portion.

Limited Access (Full Control of Access) - Highway right-of-way where rights of access of properties abutting the highway are acquired, such that all access to and from the highway are prevented except at designated locations **(L&D Manual Volume One)**.

Limited Presence Mode - Detector output continues for a limited period of time if vehicles remain in field of influence.

Load Switch - A device used to switch power to the signal lamps.

Local Transportation Assistance (LTAP) Program - **LTAP, or Technology Transfer (T2) Centers** have been established in each of the states to provide for the transfer of transportation technology and technical assistance to rural and local governments. The mission of the **Ohio LTAP Center** is to provide training, technical assistance, advice and other resources to **Ohio's** local governments, which include cities, counties, townships and villages. The **Ohio LTAP Center** is funded through the **FHWA** and **ODOT**.

Local Intersection Controller - The complete electrical mechanism mounted in a cabinet for controlling signal operation by selecting and timing the various signal head displays. The local intersection controller is located at the individual intersection site.

Local Road - A functional classification used for rural roadways whose primary function is to provide access to residences, businesses or other abutting properties **(L&D Manual Volume One)**.

Local Street - A functional classification used for urban roadways whose primary function is to provide access to residences, businesses or other abutting properties **(L&D Manual Volume One)**.

Logo Sign Panel - A reflectorized sign mounted on the **Specific Service Sign** showing the trademark logo, non-trademark logo, legend message or combination thereof for a motorist service available on a crossroad at or near an interchange.

LOGO Program - The Ohio Logo Signing Program, also known as the Specific Service Sign Program, permits eligible businesses which provide gas, food, lodging, or camping services to drivers to have their logos placed on specific service (logo) signs. See ***Part 2*** for additional information.

Longitudinal Joint - A pavement joint, in the direction of traffic flow, used to control longitudinal cracking on a rigid pavement or the joint formed between adjacent passes of a paver on a flexible pavement **(Pavement Design & Rehabilitation Manual)**.

Loop Detector - A detector that senses a change of inductance of its inductive loop sensor caused by the passage or presence of a vehicle near the sensor.

Lumen (lm) - The unit of luminous flux; equal to the flux in a unit solid angle (one steradion) from a uniform point source of one candela. Traffic signal lamp output is rated in lumens.

Luminance (brightness) RATIO - The ratio between the luminances of any two areas in the visual field.

Luminaire - The complete lighting unit consisting of a lamp or lamps together with the parts designed to distribute the light, to position and protect the lamps, and to connect the lamps to the power supply.

Luminaire Dirt Depreciation Factor (LDD) - The multiplier to be used in illumination calculations to relate the initial illumination provided by clean new luminaries to the reduced illumination that they will provide due to direct collection on the luminaires at the time at which it is anticipated that cleaning procedures will be instituted.

Luminaire Efficiency - The ratio of the luminous flux leaving a luminaire to that emitted by the lamp or lamps used therein.

Luminaire Support - A bracket or mast arm attachment to a lighting pole from which a luminaire is suspended.

Magnetic Detector - A detector that senses changes in the earth's magnetic field caused by the movement of a vehicle near its sensor.

Magnetometer Detector - A detector that measures the difference in the level of the earth's magnetic forces caused by the passage or presence of a vehicle near its sensor.

Maintenance Factor (MF) - The product of the lamp lumen depreciation factor and the luminaire dirt depreciation factor (MF = LLD x LDD).

Manual Operation - The operation of a controller assembly by means of a hand-operated device(s) (manual pushbutton).

Manual Pushbutton - An auxiliary device for hand operation of a controller.

Mast Arm - A structural support over the roadway extending from a pole, for the purpose of supporting signal heads.

Mast Arm, Flexible Mount - A mast arm mount where the signal head is attached to the mast arm by a flexible joint and connector to permit "free swinging" between the signal and the mast arm.

Mast Arm, Rigid Mount - A mast arm mount where the signal head is rigidly affixed to the mast arm to prevent any relative movement between the signal and the arm.

Master Control - Centrally located equipment designed to supervise a number of intersections and used to select programs on secondary control equipment to best suit traffic needs.

Master Controller - An automatic device for supervising a system of secondary controllers, maintaining definite time interrelationship, selecting among alternate available modes of operations or accomplishing other supervisory functions.

Master Coordinator - A coordinator used to provide synchronization and selection of programs on secondary coordinators or pretimed controllers to maintain a traffic system.

Master-secondary Controller - A controller for operating a traffic signal and for providing supervision of other interconnected (secondary) controllers.

Maximum Green - The maximum time right-of-way can be extended by actuation on a phase provided an actuation has been registered on a conflicting phase.

Maximum Initial Portion - The limit of the computed initial portion on volume density timed controllers.

Maximum Limit - See **Limit, Maximum**.

Memory, Locking - The retention of an actuation for future utilization by the controller.

Memory, Nonlocking - A mode of actuated-controller operation which does not require detector memory.

Mercury Vapor Luminaire - A lighting unit containing a mercury vapor lamp mounted within a housing with a metal frame, glass lens and a reflector.

Microprocessor - A device which uses the flexibility of computer electronics on a limited scale. Microprocessors are basically microminiaturized CPUs (Central Processing Units).

Minimum Green - (1) The shortest time for which the right-of-way shall be given to a non-actuated phase; (2) The shortest time for which the right-of-way shall be given to an actuated phase provided an actuation has been registered for that phase.

Minimum "Initial" Lumens - A minimum value of initial light output below which no more than a specified percentage of individual lamps will be permitted.

Minimum Initial Portion (Fixed Initial Portion) - A fixed preset first interval portion of the right-of-way on volume-density controllers.

Minor Movement Controller - A device that can be used with a controller unit to provide subordinate phase timing.

Modular - Equipment which is designed such that functional sections are plug-in circuit boards and can be readily exchanged with similar units.

Modular Controller, by Function - Controllers constructed so that additional functional capabilities may be provided by the addition of hardware modules. A single module provides a function(s) for one or more phases in the controller.

Modular Controller, by Phase - A controller constructed so that each timing module is associated with only one independent phase. The addition or removal of modules associated with one phase will not affect the operation of the controller with respect to the other phases.

Motorist Services - Signing for the LOGO program (gas, food, lodging or camping), emergency hospitals, generic motorist services (gas, diesel, food, lodging, camping), tourist information centers, law enforcement agencies and motorist assistance.

Mountable Curb - see **Curb, Sloping**.

Mounting Height (MT. HT.) - The vertical distance in feet (meters) between the roadway surface and the center of the light source in the luminaire.

Movement - The travel direction and destination of a lane or lanes of vehicles at an intersection, i.e. left turn, through or right turn.

Multiplexing - A communications technique which allows more than one item of information to be transmitted or received at essentially the same time.

Municipal Corporation - A city or village.

National Committee on Uniform Traffic Control Devices (NCUTCD) - A private organization of 150 to 200 experts who are involved in the daily operation of highways or streets. The committee meets twice a year to discuss proposed changes to the national **MUTCD**, develop comments, and submit them to **FHWA** for consideration. Its current members are employees of State and local agencies directly involved with traffic engineering activities, or representatives of other organizations who have a major interest in traffic control issues.

National Electrical Manufacturers Association (NEMA) - A national association of signal equipment and electrical component manufacturers that has produced specification standards on traffic signal control equipment to promote compatibility and interchangeability of signal equipment among different manufacturers.

No-Tracking Condition - The degree of solidification of a newly applied marking at which no pickup by vehicle tires occurs.

Noise - Random variations of one or more characteristics of any entity such as voltage, current and data. Generally tending to interfere with the normal operation of a device or system.

Non-actuated Phase - A controller phase with no means for receiving actuations from vehicles and pedestrians.

Non-conflicting Phases - Two or more traffic phases which will not cause interfering traffic movements if operated concurrently.

Nonadjustable Signal (Fixed-faced Signal) - A signal having the faces mounted in a casting so that the indications are presented as a fixed angle.

Noninterconnected (Isolated) Controller - A controller for operating traffic signals not under master supervision.

Normal Design Criteria - The criteria used for the design of new or reconstructed projects (all projects that do not qualify as 3R) **(L&D Manual Volume One)**.

Object Marking - A marking intended for use on obstructions within or adjacent to the roadway.

Occupancy - The percentage of roadway occupied by vehicles at an instant in time. In general use it is a measurement based upon the ratio of vehicle presence time (as indicated by a presence detector) over a fixed period of total time.

Occupant - A person driving or riding in a car, truck, bus or other vehicle **(MUTCD)**.

ODOT-maintained Highways - All highways under **ODOT's** jurisdiction for which **ODOT** has responsibility for the maintenance.

Offset - The number of seconds or percent of the cycle length that a defined time-reference point (normally the start of major street green) at a traffic signal occurs after the time-reference point of a master controller or an adjacent traffic signal.

Offset Interrupter - A device which will distribute over two or more cycles the time required for large offset changes.

Offset Selection - Choosing one of several possible offsets manually or automatically either by time of day or in response to some directional characteristic of traffic flow.

Omit, Phase (Special Skip, Force Skip) - A command that causes omission of a phase due to lack of an actuation on that phase.

Open-bottom Tunnel Visor - A visor which encircles the entire lens except a segment equal to approximately 2 inches (50 millimeters) of circumference at the bottom of the lens.

Optical Unit - An assembly of lens, reflector, light source, and other components if required, with the necessary supporting parts to be used for providing a single indication.

Optically Programmed Signal - A signal head containing optical units projecting an indication which is selectively veiled as to be visible only within desired viewing boundaries.

Overall Length (O.L.) - The total distance from the tip of the bulb to the tip of the base, including solder on the base eyelet (does not apply to PAR type lamps).

Overlap - A right-of-way indication when the right-of-way is assigned to two or more traffic phases.

Overlay Sign - See **Sign, Overlay**.

Overpass Structure-Mounted Support - See **Support, Overpass Structure-Mounted**.

Panel - A board within the controller cabinet upon which are mounted field terminals, fuse receptacles or circuit breakers and other portions of the controller assembly not included in the controller unit or auxiliary devices.

Parking Control Zone - Part of a roadway in which parking is legally prohibited, restricted or

regulated, as indicated by Regulatory Signs, pavement or curb markings.

Passage (Passage Time) - (1) The time allowed for a vehicle to travel at a given speed from the detector to the nearest point of conflicting traffic; (2) A term functionally equal to and often used interchangeably with **Unit Extension**.

Passage Detection - The ability of a vehicle detector to detect the passage of a vehicle moving through the detection zone and to ignore the presence of a vehicle stopped within the detection zone.

Passing Sight Distance - The visible length of highway required for a vehicle to execute a normal passing maneuver as related to design conditions and design speed **(L&D Manual Volume One)**.

Pattern - A unique set of traffic parameters (cycle, split and offset) associated with each signalized intersection within a predefined group of intersections (a section or subzone).

Pavement Edge (Edge of Pavement) - For design purposes, the intersection of the treated or turf shoulder and the mainline pavement **(L&D Manual Volume One)**.

Peak Hour - The maximum traffic volume hour of the day **(L&D Manual Volume One)**.

Pedestal - A vertical support on top of which the signal or controller cabinet is mounted.

Pedestal Mount - A signal head or controller cabinet mounted on top of a pedestal.

Pedestrian-Actuated Controller - A controller in which intervals such as pedestrian Walk and clearance intervals can be added to or included in the controller cycle by the actuation of a pedestrian detector (pushbutton).

Pedestrian Facilities - A general term denoting improvements and provisions made to accommodate or encourage walking.

Pedestrian Clearance Time - The time provided for a pedestrian crossing in a crosswalk, after leaving the curb or shoulder, to travel to the center of the farthest traveled lane or to a median **(MUTCD)**.

Pedestrian Interval (Walk Interval) - A traffic interval allocated to pedestrian traffic which provides a pedestrian right-of-way indication either concurrently with one or more vehicular phases or to the exclusion of all vehicular phases.

An interval during which the Walk (symbol or word) signal indication is displayed. When a verbal message is provided at an accessible pedestrian signal, the verbal message is “walk sign” **(OMUTCD)**.

Pedestrian Phase - A traffic phase allocated to pedestrian traffic which may provide a right-of-way pedestrian indication either concurrently with one or more vehicular phases or to the exclusion of all vehicular phases.

Pedestrian Recycle - Any start of pedestrian service after the start of the associated phase GREEN.

Phase - Those right-of-way and clearance intervals in a cycle assigned to any independent movement(s) of vehicle traffic or pedestrians.

Phase Diagram - A diagram illustrating the sequence of phases at an intersection with movement arrows indicated for each phase and showing overlaps, concurrent timing, etc.

Phase Omit - See **Omit, Phase**.

Phase Overlap - Refers to a phase which operates concurrently with one or more other phases.

Phase Sequence - (1) The order in which a controller cycles through all phases; (2) A predetermined order in which the phases of a cycle occur.

Photoelectric Control - An automatic switch controlled by ambient skylight intensity to turn sign or highway lighting on or off according to the changes of night or day.

Pigment - Fine solid insoluble particles which impart color and hiding power to the formulation of marking materials.

Plate, Fuse - In breakaway connections, a plate with notches for torqued bolts positioned over the point where the beam is sawed so that under vehicle impact the bolts will slip out of the notches to allow the beam to bend at the hinge plate on the opposite side.

Plate, Hinge - In breakaway connections, a plate positioned on the opposite side of the beam from the fuse plate and which bends under vehicle impact.

Point Detection - The detection of a vehicle as it passes a point or spot on a street or highway.

Polyester Markings - A mixture of polyester resin and catalyst applied by intermingling sprays to the pavement.

Post-Type Support - See **Support, Post-Type**.

Power Line Switch - See **Switch, Power Line**.

Preferred Sequence - The normal order of signal phase selection within a ring with calls on all phases.

Preemption Control - The transfer of the normal control of signals to a special control mode which may be required by railroad trains at crossings, emergency vehicles, mass transit equipment or other special needs.

Preemption Emitter - A device located on an approaching vehicle that emits a signal that, when detected by the preemption receiver, will change the normal operation of the traffic signals to provide a special sequence of signal displays for the approaching vehicle. The emitters have typically used optics, sound or radio as the signaling form.

Preemption Receiver - A device located at the signalized intersection that receives the preemption emitter signal from an approaching vehicle. In conjunction with a phase selector in the controller cabinet, the received signal causes the intersection controller to change to a predetermined signal display for the approaching vehicle.

Preformed Material - Flexible tape and sheet materials applied to the pavement by an adhesive.

Premarking - The procedure whereby the planned location of pavement marking is referenced or established by offset guide lines to assure correct placement.

Premixed Beads - See **In-Mixed Beads**.

Presence Detection - The ability of a vehicle detector to sense that a vehicle, whether moving or stopped, has appeared in its field.

Pressure Sensitive Detector - A detector that is capable of sensing the pressure of a vehicle passing over the surface of its sensor.

Pretimed Controller - A controller for the operation of traffic signals with predetermined and fixed cycle length(s), interval duration(s) and interval sequence(s).

Probe - The sensor form that is commonly used with a magnetometer-type detector.

Program Selection - The process of selecting the appropriate program for a given set of conditions. It can be accomplished manually or automatically either by time-of-day or in response to some characteristic or traffic flow.

Programmable Read Only Memory (PROM) - A device that stores data which cannot be altered by computer instructions. Data is stored ("burned") into this device externally by an electronic process. Some PROM's can be erased and programmed through special physical processes.

Proprietary Item (or Proprietary Bid) - Specified by reference to a single manufacturer's brand name or registered trademark.

PS&E (Plans, Specifications & Estimate) - A step between plan completion and construction in which **ODOT** obtains federal authorization to proceed to advertise for receipt of bids.

Pulse Mode - Detector produces a short output pulse when detection occurs.

Radar Detector - A detector that is capable of sensing the passage of a vehicle through its field of emitted microwave energy.

Radio Interference Suppressor - A device inserted in the power line in the controller cabinet that minimizes the radio interference transmitted back into the power supply line, which interference may be generated by the controller unit or other mechanism in the cabinet.

Raised Pavement Marker (RPM) - A nodular iron casting snow plowable in the two opposing longitudinal directions and equipped with a replaceable prismatic retroreflector with one or two prismatic reflective faces. See **CMS Item 721**.

Rake - The initial adjustment of a strain pole out of plumb so that it will be drawn to a vertical position under the span wire tensioning.

Random Access Memory (RAM) - A storage device with both read and write capabilities which will allow random access to stored data.

Rated "Initial" Lumens - The average amount of luminous flux (light) produced by a statistically acceptable sample of lamps on operation at rated voltage after having been seasoned to one-half to one percent of rated life.

Rated Life - The (arithmetic mean) average of burning hours for a sample number of lamps operated at rated volts and defined operating conditions.

Rated Voltage - The nominal or design operating voltage of the lamp; the voltage at which rated

watts, lumens and life are determined.

Rated Watts - The average initial power (watts) consumed when the lamp is operated at rated volts.

Read Only Memory (ROM) - A storage device not alterable by computer instructions, e.g., magnetic core storage with a lockout feature or punched paper tape. ROM requires a masking operation during production to permanently record programs or data patterns in it. Synonymous with nonerasable storage, permanent storage and read-only storage.

Recall - An operational mode for an actuated intersection controller whereby a phase, either vehicle or pedestrian, is displayed each cycle whether demand exists or not. Usually a temporary or emergency situation.

Recall, Maximum Vehicle - With the control activation, right-of-way is returned to the phase for the maximum green limit once during each cycle without the necessity for an actuation.

Recall, Minimum Vehicle - With the control activation, right-of-way is returned to the phase once during each cycle without the necessity of an actuation. Timing is for at least an initial interval portion and may be extended by succeeding vehicles.

Recall, Pedestrian - With the control activation, pedestrian walk and clearance intervals for the phase are timed once during each cycle without the necessity of a pushbutton actuation.

Recall Switch - A manual switch which shall cause the automatic return of the right-of-way to a normally actuated phase regardless of the absence of actuation on that phase.

Reflector - A device used to redirect the luminous flux from a source by the process of reflection

Reflectorization - The enhancement of the night visibility of pavement markings by means of reflective glass beads.

Reflector Unit - A thin plastic unit with rear surface indented so as to redirect light by reflection.

Refraction - The process by which the direction of a ray of light changes as it passes obliquely from one medium to another in which its speed is different.

Refractor - A device used to redirect the luminous flux from a source or a reflector, primarily by the process of refraction

Responsive Mode - A system operation wherein the selection of signal timing programs is based on current traffic data as input by vehicle sensors within the network.

Rest - The interval portion of a phase when present timing requirements have been completed.

Resurfacing, Restoration and Rehabilitation (3R) - Improvements to existing roadways, which have as their main purpose the restoration of the physical features (pavement, curb, guardrail, etc.) without altering the original design elements **(L&D Manual Volume One)**.

Resurfacing, Restoration, Rehabilitation and Reconstruction (4R) - Much like 3R, except that 4R allows for the complete reconstruction of the roadway and alteration of certain design elements (i.e., lane widths, shoulder widths, Stopping Sight Distance, etc.) **(L&D Manual Volume One)**.

Reverse Screen - A silk screen with openings such that the sign background is deposited and

the legend is not.

Rigid Overhead-Type Support - See **Support, Rigid Overhead-Type**.

Roadside - The area between the outside edge of the graded shoulder and the right-of-way limits **(L&D Manual Volume One)**.

Roadway - For traffic control purposes **(ORC 4511.01 and OMUTCD)**, "that portion of a highway improved, designed, or ordinarily used for vehicular travel, except the berm or shoulder. If a highway includes two or more separate roadways the term "roadway" means any such roadway separately but not all such roadways collectively."

For design purposes **(L&D Manual Volume One)**, "the portion of a highway for vehicle use measured either between the outside edges of the graded shoulders or face to face of guardrail."

Roundabout Intersection - A circular intersection with yield control of all entering traffic, channelized approaches, and appropriate geometric curvature, such that travel speeds on the circulatory roadway are typically less than 30 mph (50 km/h) **(MUTCD)**.

Route Markers - Signs which display a Township, County, State, U.S. or Interstate Route number or Bicycle Symbol, designed to be displayed alone or in an assembly, used to identify and mark numbered highway routes; includes various auxiliary markers used in junction assemblies, route turn assemblies and directional assemblies, etc.; also includes signs which incorporate cardinal direction and/or directional information in the body of the sign.

Route Shields - Signs which display a Township, County, State, U.S. or Interstate Route number, designed to be affixed to Guide Signs.

Sag - The amount of deflection at the lowest point of span wire used for the mounting of signal heads.

Sampling Detector - Any type of vehicle detector used to obtain representative traffic flow information.

Sealing Primer - A coating applied to surface areas prior to the placement of pavement markings to obtain proper adhesion.

Secondary Controller (Slave) - A controller which operates traffic signals under the supervision of a master controller.

Secondary Coordinator - A device used to supervise the cycle of an associated traffic actuated controller to permit synchronization and operation allowing passage of platoons of vehicles in a progressive traffic system.

Semi-Actuated Controller - A type of actuated controller in which means are provided for traffic actuation on one or more but not all approaches to the intersection.

Sensor - The sensing element of a detector.

Sequential Timing - See **Timing, Sequential**.

Serviceable Conflicting Call - A call which: (1) Occurs on a conflicting phase not having the right-of-way at the time the call is placed; (2) Occurs on a conflicting phase which is capable of responding to a call; or (3) When occurring on a conflicting phase operating in an occupancy

mode, remains present until given its right-of-way.

Service Road - Sometimes referred to as a Frontage Road or Access Road, it is a roadway, generally running parallel to the mainline, which provides access to commercial, residential or farm areas **(L&D Manual Volume Three)**.

Sheeting - A flexible film of synthetic resin in various colors. The film of reflective sheeting encapsulates a layer of glass spheres or cube-corner prisms to redirect light by retroreflection. The film of nonreflective sheeting does not contain reflective elements.

Side Mount - A signal mounting arrangement where the signal head is mounted parallel to the vertical axis of a pole.

Sign, Extrusheet - A sign assembled of horizontal sections formed of aluminum sheet and spot welded extrusions, covered with sheeting and bearing a legend.

Sign, Flatsheet - A sign cut from a single sheet of material into the proper geometrical shape, covered with sheeting and bearing a legend.

Sign, Overlay - A sign which is fastened over an extrusheet sign and which consists of a sheet of material covered with sheeting and with or without copy.

Signal Circuit Contact - See **Contact, Signal Circuit**.

Signal Shut-Down Switch - See **Switch, Signal Shut-Down**.

Signal System, Centralized Control - See **Centralized Control Signal System**.

Signal System, Distributed Control - See **Distributed Control Signal System**.

Signal System, Hybrid Control - See **Hybrid Control Signal System**.

Single-ring Controller - A controller containing two or more sequentially timed and individually selected conflicting phases so arranged as to occur in an established order.

Skip Phasing - The ability of a controller to omit a phase from its cycle of operation in the absence of demand or as directed by a master control.

Silk Screened Copy - The copy deposited on the surface of a flatsheet sign by the transmission of paste through silk screen openings.

Silk Screen Paste, Opaque - A viscous paint used to form the legend on a flatsheet sign by the silk screen method.

Silk Screen Paste, Transparent - A fluid used to form a transparent colored background (or copy) on the reflective sheeting of a flatsheet sign by the silk screen method.

Single Entry - See **Entry, Dual**.

Skins - Undesirable fragments of solidified marking material.

Slipfitter - A mounting bracket which is used on the top of a pedestal.

Softening Point - The temperature at which a solid material exhibits a condition of plasticity while

being heated.

Solid Spreader - See **Spreader, Solid**.

Solid State Device - a device characterized by electrical circuits, the active components of which are semiconductors to the exclusion of electromechanical devices or vacuum tubes.

Sonic Detector - A detector that is capable of sensing the presence of a vehicle through its field of emitted ultrasonic energy.

Span Support - See **Support, Span**.

Span Wire Hanger - A mounting bracket for supporting a signal head by clamping onto a span wire.

Span Wire Mount - A signal head suspended over the roadway on messenger wire.

Span Wire Support - See **Support, Span Wire**.

Special Skip - See **Omit, Phase**.

Specific Service Sign - A rectangular sign panel that includes: the words “GAS,” “FOOD,” “LODGING” or “CAMPING,” directional information, and one or more logo sign panels.

Specific Service Sign Program (LOGO Program**)** - The Ohio Logo Signing Program.

Speed, Legal - See **Legal Speed**.

Speed Zoning - The process of establishing reasonable and safe speed limits for sections of roadway where the statutory speed limits do not fit the road and traffic conditions. Speed Zones are intended to aid motorists in adjusting their speeds to those conditions.

Split - A division of the cycle length allocated to each of the various phases (normally expressed in percent).

Split Phase - That portion of a traffic phase that is separated from the primary movement to provide a special phase that is related to a parent phase and characterized by the inability to rest in a minor phase.

Split Selection Switch - A device on solid state controller units which when operated discontinues automatic selection of split changes which are independent of cycle length changes and permits hand selection of such split changes.

Spray Applied Markings - Pavement markings applied in the form of liquid droplets by means of a pressurized nozzle.

Spreader, Solid - A signal bracket having solid arms radiating from a hub through which wiring can be passed to provide electrical interconnection of the signal faces supported by the signal bracket.

Spreader, Tubular - A signal bracket having tubular arms radiating from a hub through which wiring can be passed to provide electrical interconnection of the signal faces supported by the signal bracket.

Staged Review Process - The process by which all reviews are accomplished at essentially three levels (stages) of development **(L&D Manual Volume Three)**.

Standard Construction Drawings - Detail drawings, identified by a specific number, published by **ODOT**, of items which are frequently used in plans and would otherwise require redrawing for each plan and have been pre-approved for general use **(L&D Manual Volume Three)**.

Standard Pay Item - An item whose requirements are defined by the Standard Construction Drawings and the Construction and Materials Specifications or Supplemental Specifications **(L&D Manual Volume Three)**.

Station - A point or position on a measured line using 100-foot (1 kilometer) increments as a base of reference **(L&D Manual Volume Three)**.

Straight Line Distance (SLD) - A system used to identify a location on the state highway system to the nearest thousandth of a kilometer, measured from west to east or south to north from the county line or from when the route begins within that county **(L&D Manual Volume Three)**.

Straight Line Mileage (SLM) - A system used to identify a location on the state highway system to the nearest hundredth of a mile, measured from west to east or south to north from the county line or from where the route begins within the county, as the route is viewed across the entire state **(L&D Manual Volume Three)**.

Stopping Sight Distance - The cumulative distance traversed from the time a driver sees a hazard necessitating a stop, actually applies the brakes, and comes to a stop **(L&D Manual Volume One)**.

Strain Pole - A vertical support to which messenger wire and hardware are attached for supporting traffic signals.

Stop Timing - Provision within a controller to suspend timing operation upon assertion of an external command.

Superelevation - The cross-slope of the pavement used to compensate for the effect of centrifugal force on a horizontal curve **(L&D Manual Volume One)**.

Supplemental Specifications - Detailed specifications for items which are in the development stage or are used only occasionally. These specifications supplement or supersede the **Construction and Material Specifications (L&D Manual Volume Three)**.

Support, Beam-Type - A ground-mounted support consisting of flanged steel beams embedded in concrete.

Support, Breakaway Beam-Type - A ground-mounted support consisting of flanged steel beams with a slip-plane joint near the ground line, with the lower stub embedded in concrete and the sign bearing portion containing a fuse and hinge plate near the lower edge of the sign.

Support, Cantilever - An overhead support consisting of a single vertical tubular member with attached arms at one side which may be single or dual.

Support, Center-Mount - A support which may be semi-overhead or of traffic clearing overhead height consisting of a single vertical tubular member with attached arms which may be symmetrical or eccentric to the vertical member.

Support, Ground-Mounted - Single or multiple posts or beams driven into the earth or embedded in concrete for the support of signs.

Support, Overpass Structure-Mounted - A skewed or flush-mounted support for attaching signs to an overpass structure, the type being determined by the overpass angle to the roadway.

Support, Post-Type - A ground-mounted support of steel single channels, channels bolted back to back, or square tubes, and normally driven into the earth.

Support, Rigid Overhead-Type - Support for a major sign or signs mounted on anchor bolt foundations and located off the berm or spanning the roadway.

Support, Span - A rigid overhead support spanning the roadway consisting of a box truss supported by single plane truss end frames.

Support, Span Wire - A support consisting of span wires connected to roadside strain poles mounted on anchor bolt foundations or embedded in concrete.

Switch, Auto-Manual - A device which, when operated, discontinues normal signal operation and permits manual operation.

Switch, Flash Control - A device which, when operated, discontinues normal signal operation and causes the flashing of any predetermined combination of signal indications.

Switch, Power Line - A manual switch for disconnecting power to the controller assembly and traffic signals.

Switch, Signal Shut-Down - A manual switch to discontinue the operation of traffic signals without affecting the power supply to other components in the controller cabinet.

Switch, Time - See **Time Switch**.

Synchronous-Motor Controller - A controller operated by a synchronous motor which maintains a constant speed determined by the frequency of the alternating current power supply.

Temporary Pavement - Any pavement whose purpose is to temporarily maintain traffic during construction, after which it is normally removed **(L&D Manual Volume Three)**.

Temporary Road - Any roadway, requiring earthwork to construct and whose sole purpose is to temporarily maintain traffic during construction, after which it is normally removed **(L&D Manual Volume Three)**.

Terminal Blocks, Field - Devices for connecting all wires entering the controller cabinet.

Thermoplastic Markings - Hot plastic markings applied to pavements by an extrusion or spraying process.

Time Switch - A device for the automatic selection of modes of operation of traffic signals in a manner prescribed by a predetermined time schedule.

Timer Gear - One of a set of different diameter gears determining the cycle time of a timer dial when inserted into the drive train.

Timing Analog - Pertaining to a method of timing that measures continuous variables such as

voltage or current.

Timing Concurrent - A mode of controller operation whereby a traffic phase can be selected and timed independently and simultaneously with another traffic phase.

Timing Control - A calibrated device that provides a time setting for an interval or portion of an interval.

Timing Dial - That part of a controller which times one cycle length and its associated split(s) and offset(s).

Timing, Digital - pertaining to a method of timing that operates by counting discrete units usually based on the frequency of the power source.

Timing, Sequential - The arrangement of phases at multi-phase intersection into a sequence in which the phases will occur consecutively.

Tourist Information Center - A place where information of interest to tourists is provided as a free service to the public.

Tourist Oriented Directional Signs (TODS) - Signs used to identify **Tourist Oriented Activities** and conforming to the specifications contained in **OMUTCD Chapter 2G**, and **Rules 5501:2-8-01 to 5501:2-8-10 of the Ohio Administrative Code**.

Tourist Oriented Activity - For purposes of the **TODS** program, any lawful cultural, historical, recreational, educational, or **Commercial Activity**, a major portion of whose income or visitors is derived during the normal business season from motorists not residing within 10 miles of the activity, and attendance at which is no less than two thousand in any consecutive twelve month period.

Traffic-Actuated Controller - A controller for supervising the operation of traffic control signals in accordance with the varying demands of traffic as registered with the controller by detectors or pushbuttons.

Traffic Adjusted System - See **Traffic Responsive System**.

Traffic Control Plan - A portion of a highway plan dedicated to signing, signalization, pavement marking and other traffic control details **(L&D Manual Volume Three)**.

Traffic Responsive Signal Control - The feature of a traffic signal control system that changes intersection signal timing based on information received from system roadway sensors.

Traffic Responsive System - A system in which a master controller (analog or digital) specifies cycle and offset based on the real-time demands of traffic as sensed by vehicle detectors.

Traffic Signal Preemption (Priority Control) - An interruption in the normal signal operation of a signalized intersection to provide predetermined signal displays to the various intersection approaches. Examples of traffic signal preemption are railroad activated, emergency preemption through direct wiring to a fire station, emergency vehicle activated, and transit vehicle activated.

Traffic Surveillance and Control System - An array of human, institutional, hardware and software components designed to monitor and control traffic, and to manage transportation on streets and highways and thereby improve transportation performance, safety, fuel efficiency and air quality.

Trailblazing Signs - Signs provided to indicate the preferred route to the Interstate or another state highway from non-state highways or streets within the city or village. Trailblazing signs are supplemental to entrance ramp approach signs.

Transmission - The process by which incident flux leaves a surface or medium on a side other than the incident side.

Transverse Joint - A pavement joint perpendicular to the centerline alignment of the pavement, designed to control cracking, provide for load transfer, and allow for the contraction and expansion of the pavement **(Pavement Design & Rehabilitation Manual)**.

Treated Shoulder - That portion of the graded shoulder which has some type of surface treatment **(L&D Manual Volume One)**.

Tree Lawn - The space between the face of the curb and the sidewalk for the purpose of providing snow storage, a buffer between vehicles and pedestrians, a place for signs, and to improve aesthetics **(L&D Manual Volume One)**.

Trumpet Interchange - A Semi-directional T interchange **(L&D Manual Volume One)**.

Tubular Spreader - See **Spreader, Tubular**.

Uniformity - Illumination on roadways is usually expressed as a ration of average illumination to minimum illumination at any point on the roadway.

Unit Extension - See **Passage.**

Vertical Clearance - The distance, measured vertically, from the surface (pavement, shoulder, ground, etc.) to a fixed overhead object (bridge superstructure, sign, signal, etc.) **(L&D Manual Volume One).**

Village - A municipal corporation having a population of less than 5,000 persons.

Visibility - The quality or state of being perceivable by the eye. In outdoor applications, visibility is defined in terms of the distance at which an object can be just perceived by the eye.

Visual Acuity - The ability to distinguish fine detail. Quantitatively, the reciprocal of the angular size in minutes of the critical detail which is just large enough to be seen.

Visual Angle - The angle which an object or detail subtends at the point of observation. It usually is measured in minutes of arc.

Visual Field - The locus of objects or points in space which can be perceived when the head and eyes are kept fixed. The field may be monocular or binocular.

Visual Surround - All portion of the visual field except the visual task.

Visual Task - Those details and objects which must be seen for the performance of a given activity, including the immediate background of the details or objects

Volume-Density Controller - A controller used with detectors located a sufficient distance in advance of the intersection which makes use of vehicle actuation quantities and time-of-waiting of the initial vehicle to vary green interval portions for increased capacity and minimized delays.

Walk Interval - See **Pedestrian Interval**.

Warning Light - A portable lens-directed, enclosed yellow light normally battery powered, which may be used in a steady or flashing mode.

Weekly Programmer - A device used to determine the time of operation of programs on traffic control equipment according to a weekly schedule which may be preset to vary from day to day.

Work Limits - The extreme longitudinal limits of the contractor's responsibility, including all temporary and incidental construction (except temporary traffic control devices). Identified by the "Work Limit" station on the centerline of construction on the mainline and on the centerline of all side roads, cross roads, and other construction generally running perpendicular to the project or separated from the project **(L&D Manual Volume Three)**.

Work Zone Pavement Markings - Markings placed for a limited time to direct traffic movement during project construction.

Yield - The action of allowing a semi-actuated controller, or a full-actuated controller operating in the semi-actuated mode, to terminate the main street phase so as to begin satisfying existing cross street demand.

Yellow-Red Flash Terminals - Terminals which are wired to give the option of flashing either yellow or red on each traffic signal face by rearranging jumpers and/or field wires.

Zone of Detection - That area of the roadway within which a vehicle is detected by a vehicle detector system.

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1305 FREQUENTLY ASKED QUESTIONS (FAQs)

A page will be developed for the **OTE** website for a list of frequently asked questions (FAQs) and their answers. Suggestions for items to include in this list should be forwarded to the **OTE Standards Section**.

For reference, copies of items developed for this web page will also be included herein. Each item will be included as a separate numbered section. They will be shown as they are intended to be presented on the FAQ web page, i.e., other **TEM** style/formatting rules are suspended.

The following are drafts of two items expected to be among the first posted on the **OTE** FAQ web:

What Are the Requirements for Multiway Stop Installations?

As noted in Section 2B.07 of the Ohio Manual of Uniform Traffic Control Devices (OMUTCD), "Multiway stop control can be useful as a safety measure at intersections if certain traffic conditions exist. Safety concerns associated with multiway stops include pedestrians, bicyclists, and all road users expecting other road users to stop. Multiway stop control is used where the volume of traffic on the intersecting roads is approximately equal."

Generally, multiway stop installations should be used sparingly because of the significant increases in delays and operating costs that can result from requiring all of the vehicles using the intersection to stop. Also, unnecessary stops, when the intersection is clear of conflicting movements, can lead to general disrespect for STOP signs.

Any decision to install multiway stop control should be based on an engineering study. OMUTCD Section 2B.05 addresses restrictions on the use of STOP signs that also apply to mulitway stop applications. Section 2B.07 of the manual contains criteria that should be considered as part of the engineering study

How Do I Get a Traffic Signal Installed?

Many people seem to believe that traffic signals are the answer to all traffic problems at intersections. If this were true, no traffic engineer in his right mind would deny a request for a traffic signal.

Traffic signals should be installed when they will alleviate more problems than they will create. This must be determined on the basis of an engineering study.

A warranted traffic signal which is properly located and operated may provide for more orderly movement of traffic and may reduce the occurrence of certain types of accidents. On the other hand, an unwarranted traffic signal can result in increased delay, congestion and accidents.

The first step in getting a traffic signal installed is to determine the governmental agency that has jurisdiction for the intersection and contact that agency.

If the Ohio Department of Transportation (ODOT) has jurisdiction, then contact the Transportation Planning and Programs Administrator in your local District Office with your request.

The District will then perform a warrant analysis. The warrants for a traffic signal are listed in the Ohio Manual of Uniform Traffic Control Devices, Chapter 4C. If the intersection meets any one of these warrants, then the next step is to use sound engineering judgement to determine if the signal should be installed. There are cases that because of poor geometry, proximity to existing signals, etc. a location may meet the warrants but not be signalized.

If a traffic signal can be installed without negatively impacting other intersections or the traveling public, then the traffic signal should be designed and constructed.

As per the Ohio Revised Code, ODOT can only install and operate traffic signals at public streets. If a private development warrants a traffic signal, then the development must enter into an agreement with the Ohio Department of Transportation, pay for the installation of the traffic signal and pay a yearly maintenance/operating fee to ODOT.

The need for traffic signals should be based on competent engineering study.

1310 ODOT DIRECTIVES

Various **ODOT Directives** have been established. These **Directives** primarily address administrative concerns; however, since they do include information about worker safety issues, and in keeping with our mission to use this Manual to provide a convenient reference, a listing of the them has been included. The individual **Directives** are posted on the **ODOT** O-Drive in the file "Directvs."

Number	Subject	Number	Subject
D - DIRECTIVE		**SA - SAFETY**	
D-101	Directive Distribution	SA-101	Motorists - Stranded
D-201	Panhandle Rail Lease	SA-102	Accidents
D-301	EEO Policy	SA-103	Field Work
F - FISCAL		SA-104	Safety
F-101	Time Sheets	SA-105	Emergency Evacuation
F-102	Travel	SA-106	Injury/Occupation Disease
F-103	Purchasing	SA-201	Safety (Employee)
F-104	Taxes, Federal/State	SA-202	Driver's License
F-201	Inventory	SA-203	Fire Prevention
F-202	Invoices	**SE - SERVICES**	
F-203	Accounts Receivable	SE-101	Mail
F-204	PO-Fiscal Year End	SE-102	Records Management
P - PERSONNEL		SE-201	Training
P-101	Employment Applications	**WR - WORK RULES**	
P-102	Certification	WR-101	Disciplinary Actions
P-103	Probationary Periods	WR-102	Suspension/Removal
P-104	Performance Evaluations	WR-201	Ethics
P-105	Co-ops	WR-202	Political Activity
P-106	Leave and Holidays	WR-203	Stolen Property
P-201	Working Hours	WR-204	Smoking
P-202	Step Increases	WR-301	Subpoenas
P-203	Disability/Worker's Compensation	WR-302	Court of Claims
P-204	Disability Leave	WR-303	Records/Public
P-205	Layoff	WR-304	Death of Employee

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1311 OTHER OTE POLICIES, GUIDELINES & STANDARD PROCEDURES

At times, there may be a need for the **Office of Traffic Engineering (OTE)** to issue a separately numbered formal **ODOT Policy**, **Guideline** or **Standard Procedures (SOPs or SPs)** separate from the text of the **TEM**. As noted in the index below, two policies have been issued. These policies are available on the Intranet under "ODOT Transportation Policies." For the convenience of **TEM** users, copies of these policies have been included in ***Section 1399***.

No.	Subject / Title	Date
Policies		
516-002(P)	INSTALLATION OF TRAFFIC CONTROL SIGNALS AND INTERSECTION CONTROL BEACONS ON STATE HIGHWAYS	July 22, 1998
516-003(P)	TRAFFIC MANAGEMENT IN WORK ZONES INTERSTATE AND OTHER FREEWAYS	July 18, 2000
Guidelines		
Standard Procedures		

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1312 OTHER ODOT POLICIES, GUIDELINES & STANDARD PROCEDURES

There are various **ODOT Policies**, **Guidelines** and **Standard Procedures (SOPs and SPs)** issued by other **ODOT** offices that have been, or will be, referenced in the **TEM** text. These are (will be) listed in the index below. The six **Policies** and the **Standard Procedure** are available on the Intranet under "ODOT Transportation Policies." The **"ODOT Standard"** is available through the **ODOT** website for the **Office of Urban and Corridor Planning** under "Functional Class," as well as through the Intranet under the **Office of Urban and Corridor Planning**. Copies of the documents listed are also available from the **OTE Standards Section**. For the convenience of **TEM** users, copies of the **Policies** listed have been included in ***Section 1399***.

No.	Responsible Division or Office	Subject / Title	Date
Policies			
22-007(P)	Highway Operations	Preventive Maintenance Policy	Sep. 24, 2001
25-005(P)	Local Projects	Transportation Enhancement Program	Jan. 25, 1999
27-005(P)	Construction Management	Construction and Materials Specification Development Policy	August 1, 2001
310-002(P)	Local Projects	State Scenic Byway Program Policy	Sep. 1, 1998
322-001(P)	Roadway Engineering Services	Policy on the Use of Rumble Strips on Shoulders	Dec. 18, 1996
519-002(P)	Roadway Engineering Services	Curb Ramps Required in Resurfacing Plans	April 18, 1996
Guidelines			
Standard Operating Procedures			
ODOT Standard	Urban and Corridor Planning	Procedures for Processing Revisions to Highway Functional Classification, Federal-aid Systems, and Urban/Urbanized Area Boundaries	Dec 20, 1999
510-005(SP)	Construction Management	Construction and Materials Specification: Development Standard Procedure	August 1, 2001

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1313 OTE FORMS

Various forms developed by the **Office of Traffic Engineering (OTE)** in support of procedures described in this **Manual** have been included in earlier chapters. Forms developed in the future, if not shown in the applicable chapter(s), will be included in ***Section 1396***.

Full-size versions of **OTE** forms (standard letter-size sheet without the **TEM** header and footer) will be available on the **OTE** web page; however, paper and electronic copies of these forms are also available from the **OTE Standards Section**.

1314 OTHER ODOT FORMS

Other **ODOT** forms used in support of procedures described in this **Manual** have been (or will be) referenced and/or shown in earlier sections. If a form is not shown in the chapter in which it is mentioned or in ***Section 1396*** of this chapter, if needed, please contact the responsible **ODOT** Office or their website for a copy. (At this time, there are no forms shown in ***Section 1396***.)

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1396 FORMS INDEX - no forms at this time

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1399 INDEX OF RESOURCE MATERIALS INCLUDED

For the convenience of **TEM** users, copies of various separate **Policies**, **Guidelines** and **Standard Procedures** are (or will be) provided in this section. Forms have not been included because of the quantities involved. The eight **Policies** and the **Standard Procedure** are available on the Intranet under "ODOT Transportation Policies." The **"ODOT Standard"** is available through the **ODOT** website for the **Office of Urban and Corridor Planning** under "Functional Class," as well as through the Intranet under the **Office of Urban and Corridor Planning**. Copies of the **Policies** and **Standard Procedures** are also available from the **OTE Standards Section**

The following material is not numbered as pages of the **TEM**; therefore, an index has been provided herein to help locate the material.

No.	Subject / Title	Date
Policies		
22-007(P)	Preventive Maintenance Policy	Sep. 24, 2001
25-005(P)	Transportation Enhancement Program	Jan. 25, 1999
27-005(P)	Construction and Materials Specification Development Policy	August 1, 2001
310-002(P)	State Scenic Byway Program Policy	Sep. 1, 1998
322-001(P)	Policy on the Use of Rumble Strips on Shoulders	Dec. 18, 1996
516-002(P)	Installation of Traffic Control Signals and Intersection Control Beacons on State Highways	July 22, 1998
516-003(P)	Traffic Management in Work Zones Interstate and Other Freeways	July 18, 2000
519-002(P)	Curb Ramps Required in Resurfacing Plans	April 18, 1996
Guidelines		
Standard Operating Procedures		
ODOT Standard	Procedures for Processing Revisions to Highway Functional Classification, Federal-aid Systems, and Urban/Urbanized Area Boundaries	
510-005(SP)	Construction and Materials Specification: Development Standard Procedure	August 1, 2001

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Approved:

Policy: 22-007(P)
Effective: September 25, 2001
Responsible Office: Division
Highway Operations
Supersedes: 22-007(P)
Dated: September 24, 2001

Gordon Proctor
Director

PREVENTIVE MAINTENANCE POLICY

POLICY STATEMENT:

The Ohio Department of Transportation (ODOT) shall establish statewide practices and procedures, overseen by the Division of Highway Operations, to provide uniform standards of acceptable operating conditions for preventive maintenance. The work effort expended toward these preventive maintenance activities will be incorporated into the County Annual Work Plan. Division of Highway Operations will perform quality assurance reviews (QAR) on the proposed and completed work plans to ensure compliance with this policy.

The preventive maintenance policy activities include raised pavement markers, electrical traffic control devices, signing, highway lighting, mowing and vegetation, surface cleaning, underdrain outlet cleaning, pavement maintenance and bridge maintenance. This policy is also intended to be in conformance with FHWA's interim guidance concerning preventive maintenance eligibility.

AUTHORITY:

Ohio Revised Code , Section 5501.31

REFERENCES:

1. Policy No.: 512-002(P), Roadside Vegetation Management, Mowing and Herbicide Application
2. Traffic Engineering Manual
3. Pavement Preventive Maintenance Program Guidelines
4. Bridge Preventive Maintenance Manual
5. Signal Inspection Manual
6. ODOT Construction & Materials Specifications (CMS)
7. FHWA Interim Guidance Concerning Preventive Maintenance Eligibility, June 26, 2000

SCOPE:

All County and District personnel involved in preventive maintenance.

PROCEDURE STATEMENT:

I. RAISED PAVEMENT MARKERS

Raised pavement marker reflectors shall be replaced on a two (2) to four (4) year cycle .

Refer to TEM Section 302-2 for additional guidance.

II. ELECTRICAL TRAFFIC CONTROL DEVICES

ODOT maintained traffic signal installations shall be inspected a minimum of one time annually. The Traffic Signal Inspection Manual defines the traffic signal inspection and rating process. In addition to the annual traffic signal inspection, the following routine scheduled maintenance shall be performed by either District Roadway Services section personnel or a signal maintenance contractor:

A. Traffic Control Signals and Intersection Control Beacons

1. Every 18 months replace incandescent lamps behind all lenses and check the electrical cable and its connections in and near the signal heads.

2. Every 6 months test the conflict monitor with an automatic conflict monitor tester.

B. School Flashers, Flashing Signs, Illuminated Signs and other Electrical Traffic Control Devices

1. Every 24 months replace incandescent lamps behind all lenses and check the electrical cable and its connections in and near the signal head.

2. Replace mercury vapor lamps every 4 years. Clean all reflectors, lenses, tubes and /or lamps.

C. Signal Support Inspection

All signal supports shall be inspected at a maximum five year interval. New signal supports shall be inspected at the time of construction.
Refer to TEM Section 460, TEM Section 407-2 and the Signal Inspection Manual for additional guidance.

III. SIGNING

A. Systematic Sign Replacement

Each District shall develop and implement a program to provide for the systematic replacement of permanent traffic control signs on a fifteen year cycle. The District replacement program will have a QAR performed by the Office of Traffic Engineering.

Refer to TEM Section 200-6 for additional guidance.

B. Bridge Mounted Overhead Sign Support Inspection

Bridge mounted overhead sign supports and overhead sign supports with bridge mounted foundations shall be inspected annually, in accordance with the Bridge Inspection Manual.

Refer to TEM Section 214-3 for additional guidance.

C. Overhead Sign Support Inspection

All other non-bridge mounted overhead sign supports shall be inspected at a maximum of 5 year intervals. New overhead sign supports shall be inspected at the time of construction.

Refer to TEM Section 214-3 for additional guidance.

D. Sign Lighting

Each District shall make a monthly inspection of all sign lighting locations. Mercury vapor lamps shall be repaired within one month of a reported failure. Mercury vapor lamps shall not remain in service more than four (4) years from the date of their installation.

IV. HIGHWAY LIGHTING

Preventative Maintenance for highway lighting luminaires, supports, circuits, pullboxes, power services shall be as defined in a Section of the TEM to be published in the future.

V. MOWING AND VEGETATION

Mowing frequency will be reported on the County work plan.

Refer to Policy No.: 512-002(P) dated December 1, 1997

VI. SURFACE CLEANING

Remove all foreign debris, by mechanical sweeping, on bridge decks and along curbs, gutters, and barriers.

Removal will be performed annually.

VII. UNDERDRAIN OUTLET CLEANING

Underdrain clean out shall consist of locating the outlet, removing any silt, debris, or vegetative material which has built up, and insuring there is positive connection at the outlet pad. For new installations, the outlets should be checked one year after the project is completed and cleaned out if necessary. Thereafter and for existing installations, the outlets should be checked every three years and cleaned out as necessary. For upcoming construction projects, including minor and major rehabilitation or complete pavement replacement, the outlets should be checked one year prior to the project sale date and cleaned out if necessary.

Please refer to the Pavement Preventive Maintenance Program Guidelines for more details.

VIII. PAVEMENT PREVENTIVE MAINTENANCE

Proper treatment selection and timing is critical to a successful pavement preventive maintenance program. Treatment selection and appropriate timing decisions should be made in accordance with the Pavement Preventive Maintenance Program Guidelines, which are available from the Office of Pavement Engineering. Each county will have preventive maintenance treatment goals established in accordance with their system conditions. The pavement preventive maintenance treatments shall be included in the District work plan. The Office of Pavement Engineering will perform QAR's to ensure the district work plan is sound.

Please refer to the Pavement Preventive Maintenance Program Guidelines for more details.

IX. BRIDGE PREVENTIVE MAINTENANCE

The Bridge Preventive Maintenance Manual addresses the various preventive maintenance techniques and timing associated with each procedure. A preventive maintenance "Procedure Identification Form" shall be developed a committee of District Bridge Engineers and the Office of Structural Engineering for use by the district bridge inspectors during each of their required annual bridge inspections. This form will be submitted along with the associated bridge inspection form (BR-86) to help direct the district bridge preventive maintenance tasks. A Quality Assurance Review shall be performed by the Office of Structural Engineering to ensure compliance.

Refer to the Office of Structural Engineering's web site for a link to the Bridge Preventive Maintenance Manual. http://www.dot.state.oh.us/se/Default.asp

TRAINING:

Preventive Maintenance Area	Training Agent
1. Mowing & Vegetation	External (Refer to Policy No.: 512-002(P))
2. Traffic Signal Maintenance	Office of Traffic Engineering
3. Overhead Sign Support Inspection	Office of Traffic Engineering
4. Bridge Maintenance	Office of Structural Engineering

FISCAL ANALYSIS:

The preventive maintenance measures contained herein will have a fiscal impact on the District allocations. Increased funding needs due to roadside conditions and preventive maintenance goals will be included in future maintenance contract allocations. Existing District allocations must absorb any additional costs prior to the next allocation period.

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Approved:

Gordon Proctor
Director

Policy 25-005(P)
Effective: December 1, 2003
Responsible Office: Local Programs
Supersedes Policy: 310-001(P)
Dated: January 25, 1999

TRANSPORTATION ENHANCEMENT PROGRAM POLICY

POLICY STATEMENT:

This policy establishes funding participation and qualifying activities for the use of Transportation Enhancement (TE) funds for Ohio Department of Transportation (ODOT) sponsored projects for state-owned and/or state-maintained facilities, and those projects sponsored by local governments outside the boundaries of Metropolitan Planning Organizations (MPOs). ODOT suballocates TE funds to MPOs for local government projects within MPO boundaries. This program uses Federal funds to creatively integrate transportation facilities into their surrounding communities and the natural environment. ODOT encourages adding enhancements to planned projects rather than stand-alone projects.

For locally-sponsored projects, ODOT will provide up to 80 percent of the construction cost of a project up to a specified maximum. The applicant is required to provide funds for a minimum of 20 percent of the construction cost, and for all costs associated with the architecture/engineering plans, environmental studies and documentation, right-of-way plans, right-of-way acquisition and environmental remediation, if necessary. Right-of-way acquisition costs are only allowable for specific qualifying activities as provided below.

Proposed TE projects must have a direct relationship to surface transportation, be publicly-owned and on existing publicly-owned property (except for qualifying acquisition activities), be accessible to the general public or targeted to a broad segment of the general public, and be one of the following qualifying activities:

Historic and Archaeological Transportation Enhancements

- Acquisition of historic site
- Historic highway program
- Historic preservation
- Rehabilitation and operation of historic transportation buildings, structures or facilities (including historic railroad facilities and canals)
- Archaeological planning and research
- Establishment of transportation museums

Scenic and Environmental Transportation Enhancements

- Acquisition of scenic easements and scenic sites
- Scenic highway programs including the provision of tourist and welcome center facilities

- Landscaping and other scenic beautification

Bicycle and Pedestrian
- Provision of bike lanes, signed routes, separate paths, grade separations, parking facilities, bike-safe grates or other facilities
- Provision of safety and educational activities for bicycles and pedestrians
- Preservation of unused railway corridors for the purpose of creating shared use trails (includes acquisition or construction)

The allocation for the TE Program will be established by ODOT and will be administered by the Division of Local Programs.

AUTHORITY:

23 USC 133

REFERENCES:

This policy supercedes Policy 310-001(P) dated January 25, 1999.

SCOPE:

This policy is applicable to all Districts, Divisions and Offices of the Department; and to all local governments outside of Metropolitan Planning Organization (MPO) boundaries.

BACKGROUND AND PURPOSE:

The TE Program was initiated by Congress in the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) for transportation-related activities that are designed to strengthen the cultural, aesthetic, and environmental aspects of the Nation's intermodal transportation system.

TRAINING:

None required.

FISCAL ANALYSIS:

The ODOT Funds Management Committee sets the funding amounts for this program. Implementation of this policy will have no additional fiscal impact to ODOT.

Approved

Policy No.: 27 - 005(P)
Effective: August 1, 2001
Responsible Office: Division of Construction Management

Gordon Proctor
Director

CONSTRUCTION AND MATERIALS SPECIFICATION DEVELOPMENT POLICY

POLICY STATEMENT:

The Division of Construction Management is assigned the responsibility and authority to develop, implement, maintain and update construction and material specifications. This is to ensure construction quality and a uniform and consistent administration of construction projects by all districts.

Five specification committees will process specifications in the major work items: Pavement Materials and Construction, Structures, Earthwork and Hydraulics, Contract Administration, Traffic and other miscellaneous work items. Each working committee will review existing specifications, and adopt new specifications.

An executive committee will give final review and approval of all Department specifications.

AUTHORITY:

Section 5501.02, 5501.03, and 5501.31, Ohio Revised Code (ORC)

REFERENCE:

Policy, Standards, Manuals, and Handbook Development, 123-001(P)

Standard Procedure for the Development and Review of Construction and Material Specifications, 510-002 (SP)

SCOPE:

The contracting industry, FHWA and any affected department employee may request revisions to the specifications. The requested specification updates and changes should be quickly adopted in order to enhance the quality of construction and to reduce ambiguities in the bidding documents.

Specification development will be conducted in an open and fair atmosphere to ensure compliance with applicable laws, regulations, policies, and standard operating procedures.

Central office divisions, working with district counterparts, will partner with FHWA and industry members in the specification development process.

All committee members are expected to work together to provide expert knowledge and ensure acceptance of the specifications.

FISCAL IMPACT:

The operational fiscal impact of this policy is expected to be limited to committee members' time.

Approved:

//s// Jerry Wray
Jerry Wray
Director

Effective: September 1, 1998
Responsible Office: Division of Multi-Modal Planning & Programs
Policy No: 310-002(P)

STATE SCENIC BYWAY PROGRAM POLICY

PURPOSE

The purpose of this policy statement is to establish program policy statewide for uniformity and consistency in developing, implementing and maintaining the State Scenic Byway Program.

AUTHORITY

Transportation Equity Act for the 21st Century (TEA-21) (Public Law 105-178)
Section 5516.05 Ohio Revised Code

REFERENCES

Federal Register, Vol. 60, No. 96, May 18, 1995
Section 5516.01, Ohio Revised Code

SCOPE

All Districts, Divisions and Offices of the Ohio Department of Transportation

BACKGROUND

The Ohio Department of Transportation (ODOT) established a State Scenic Byway Program in 1994 in response to changes in Federal law. This program replaced the Scenic Highways Program established by ODOT in 1962.

DEFINITIONS

Applicant: Must be a local political subdivision, board, commission, or other governmental entity identified under Section 5501.03 (c) of the Ohio Revised Code as being eligible for assuming administrative responsibilities for ODOT improvement projects.

Archaeological: Visual evidence of the unique customs, traditions, folklores, or rituals of a no longer existing human group.

Byway Corridor Management Plan (BCMP): A planning document, developed with community involvement, that specifies the actions, procedures, controls, operational practices and administrative strategies to maintain the scenic, natural, cultural, historical, recreational and/or archeological qualities of the scenic byway corridor.

Corridor: The road or highway right-of-way and the adjacent area that is visible from and extending along the highway. The distance the corridor extends from the highway could vary with the different intrinsic qualities.

Cultural: Visual evidence of the unique customs, traditions, folklores, or rituals of a currently existing human group.

Historic: Landscapes, buildings, structures, or other visual evidence of the past. It has to be something that can still be seen - not just the site of something that used to be there.

Intrinsic Quality: Scenic, historic, recreational, cultural, archaeological, or natural features that are considered representative, unique, irreplaceable, or distinctly characteristic of an area.

Natural: Minimal human disturbance of the natural ecological features that are associated with the region.

Recreational: The road corridor itself is used for recreation like jogging, biking, roadside picnics, or direct access to recreational sites like campgrounds, lakes, or ski lodges.

Scenic: Beauty, whether natural or human made. The quality of the features are measured by how memorable, distinctive, uninterrupted, and unified they are.

Scenic Byway Technical Review Committee: A group of nine (9) individuals, representing ODOT, state agencies and the public, appointed by the Director of ODOT to review Applications and Byway Corridor Management Plans submitted to the Director for State Scenic Byway designation. Members hold two-year staggered terms. Public members will represent organizations addressing one of the six intrinsic values.

Scenic Byways:

State Scenic Byway: a road or highway under State, Federal, or local ownership designated by the State for its scenic, historic, recreational, cultural, archaeological, and/or natural qualities. This refers not only to the road or highway itself but also to the corridor through which it passes.

National Scenic Byway: a road or highway considered significant in at least one of the six categories and typically a State-designated scenic byway. Applications are submitted to Federal Highway Administration (FHWA) and designation made by the Secretary of Transportation. This refers not only to the road or highway itself but also to the corridor through which it passes.

All-American Road: The road or highway must not only meet requirements for designation as a National Scenic Byway but must also satisfy added criteria including significant in at least two of the six categories. Applications are submitted to the Federal Highway Administration (FHWA) and designation made by the Secretary of Transportation.

PROCEDURE STATEMENT

I. ELIGIBILITY CRITERIA

A. A State Scenic Byway must possess one of the outstanding intrinsic qualities: scenic, natural, historical, cultural, recreational, and/or archaeological.

B. It must be an existing road with legal, public access. This includes any combination of routes under either federal, state or local jurisdiction.

C. The road must safely and conveniently accommodate two-wheel drive automobiles.

D. The State Scenic Byway must be a minimum of five (5) miles in length.

II. APPLICANT RESPONSIBILITIES

A. Application

1. All Applications for State Scenic Byways must be submitted by a political subdivision of the state to ODOT, Division of Multi-Modal Planning and Programs. Each Application must include mapping to accurately locate the byway.

2. ODOT will notify the Applicant in writing of approval or disapproval of their Application.

3. If disapproved, the Applicant is sent a written notification with a reason for denial. The Applicant may resubmit a revised Application.

B. Byway Corridor Management Plan

1. If the Application is approved, the Applicant may proceed to the preparation of the Byway Corridor Management Plan (BCMP).

2. The Applicant must complete and receive approval of the BCMP before the Byway receives official designation.

C. Implementation Procedures

1. The Applicant must begin implementation of the BCMP within six (6) months after approval.

2. The Applicant will provide ODOT with a status report on the implementation of each applicable item in the BCMP within one (1) year after the approval date.

3. The Applicant may propose revisions to the original BCMP that respond to changing circumstances and priorities. ODOT must approve revisions to the originally approved BCMP.

III. ODOT RESPONSIBILITIES

A. Technical Review Committee

1. ODOT staff members in the Division of Multi-Modal Planning and Programs will recommend individuals representing ODOT, state agencies and the public to the Director to sit on the Technical Review Committee.

2. The Director will appoint the members to two-year staggered terms.

B. Application Procedures

1. ODOT staff members in Central Office and the Districts will provide technical assistance to the Applicant and the byway groups in the preparation of the Application.

2. ODOT staff members and the Technical Review Committee will review the Application and recommend approval or disapproval to the Deputy Director for the Division of Multi-Modal Planning and Programs.

3. Within ninety (90) days from receipt of the Application, ODOT will notify the Applicant in writing of approval or disapproval of their Application. If disapproved, the Applicant is sent a written notification with a reason for denial. The Applicant may resubmit a revised Application.

C. Byway Corridor Management Plan

1. ODOT staff members in Central Office and the Districts will provide technical assistance to the Applicant and their byway groups in the preparation of the BCMP.

2. ODOT staff and the Byway Technical Review Committee will review the BCMP and recommend approval or disapproval to the Director.

3. The Director of ODOT will concur or disagree with the Committee's recommendation.

4. ODOT will notify the Applicant in writing, within ninety days from receipt of a BCMP, of approval or disapproval of their BCMP.

5. ODOT will designate the route as a State Scenic Byway after the BCMP is approved.

6. ODOT will submit two (2) copies of the Applicant's BCMP to the Ohio Division Office, Federal Highway Administration, upon approval for State designation, if the Applicant is seeking National and/or All-American Road designation.

D. Signing Procedures

1. ODOT will install and maintain State Scenic Byway identification signs on all state routes under ODOT's jurisdiction.

2. ODOT will provide State Scenic Byway identification signs at no cost to the Byway Sponsor. The Byway Sponsor must coordinate with the local jurisdiction responsible for the roads to install and maintain the State Scenic Byway identification signs.

3. ODOT will determine the process for signing multi-designated State and National Scenic Byways. These will be determined on an individual byway basis.

II BYWAY TECHNICAL REVIEW COMMITTEE RESPONSIBILITIES

A. Application Procedures

1. Members of the Technical Review Committee, with ODOT staff, will meet quarterly to review the Applications.

2. The members of the Technical Review Committee will recommend approval or disapproval of the Applications to the Deputy Director for the Division of Multi-Modal Planning and Programs.

B. Byway Corridor Management Plan

1. Members of the Technical Review Committee, with ODOT staff, will meet quarterly to review Byway Corridor Management Plans.

2. The members of the Technical Review Committee will recommend approval or disapproval of the BCMP to the Director.

IV. DE-DESIGNATION PROCEDURES

A. Failure to submit status reports or to document reasonable progress toward implementation of the BCMP may result in a withdrawal of the State Scenic Byway designation by the Director of ODOT.

B. Failure to maintain the Scenic Byway at levels defined by the BCMP may result in a withdrawal of the designation by the Director of ODOT.

C. Previously identified Scenic Highways lost their designation on March 31, 1998. The local political subdivision may apply, at any time, to become a State Scenic Byway.

V. SIGNS

A. Outdoor Advertising on State Scenic Byways must conform with existing state and federal laws on outdoor advertising.

B. In compliance with federal law, states may exclude from state or federal scenic byways designation any segment of a scenic road in a commercial or industrial section that the state determines to be inconsistent with the state's criteria for designating the scenic byway section. Byway segments in commercial or industrial areas are not automatically excluded.

VI. IMPACT ON HIGHWAY IMPROVEMENTS

The designation of a road as a State Scenic Byway does not impose any additional highway improvement restrictions on the road.

TRAINING

Training on the program process is recommended for ODOT personnel who will be assisting scenic byways Applicants. ODOT will hold training workshops annually for this purpose. ODOT will meet with communities requesting a State Scenic Byway, as needed.

FISCAL ANALYSIS

Implementation of this program will have no significant fiscal impact upon the Ohio Department of Transportation.

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Approved:

Effective: December 18, 1996
Responsible Office: Planning
Policy No.: 322-001(P)

_____
Jerry Wray, Director

POLICY ON THE USE OF RUMBLE STRIPS ON SHOULDERS

PURPOSE:

The purpose of this policy statement is to establish the details and procedures for the use of rumble strips on the shoulders of Ohio roadways.

AUTHORITY:

Ohio Revised Code Statutes 5501.02, 5501.03, 5501.31.

REFERENCES:

1. NCHRP Synthesis 191, "Use of Rumble Strips to Enhance Safety," National Academy Press, Washington, D.C., 1993

2. FHWA report No. RD-85/027, "Effects of Shoulder Textured Treatments on Safety, Final Report", August, 1985

3. Ohio Department of Transportation, "Location and Design Manual, Volume 1."

4. Ohio Department of Transportation, "Standard Construction Drawings, BP-9.1M and 9.2M."

5. Ohio Department of Transportation, "Construction and Materials Specification, Item 618 Shoulder Rumble Strips."

SCOPE:

All Districts, Divisions and Offices of the Ohio Department of Transportation (ODOT) involved in the design, construction and maintenance of roadways and all consultants and contractors who provide similar services to ODOT.

BACKGROUND:

Shoulder rumble strips have proven to be effective in reducing run-off-the-road accidents due to driver inattention, monotony and fatigue. They also may serve as an audible form of roadway edge delineation in adverse weather conditions. Rumble strips are most appropriate for use on higher speed facilities where access is controlled through interchanges or widely-spaced intersections (several miles apart) and are also appropriate for other roadways with a history of run-off-the-road accidents due to driver inattention.

This policy supersedes the rumble strip information shown on Standard Construction Drawing BP-8.1M, dated 10-28-94.

This policy does not address rumble strips in travel lanes. Refer to Traffic Control Application Standard 8A-2 for installation guidelines in travel lanes.

DEFINITIONS:

Rumble Strip: As used in this policy, a pattern of grooves or depressions made in paved highway shoulders to produce an audible and/or vibratory warning to drivers whose vehicles have drifted off the traveled way.

POLICY:

1. ELIGIBLE HIGHWAY LOCATIONS

It is the policy of the Ohio Department of Transportation to install rumble strips on the shoulders of selected roadways. Eligible locations are as follows:

a. Rumble strips will be installed on new, reconstructed, and resurfaced shoulders of all rural fully access-controlled highways (interstates and freeways).

b. Shoulder rumble strips will be installed on sections of any highway with a history of run-off-the-road accidents due to driver inattention, fatigue, or sleep. For this purpose, a threshold rate of 0.25 run-off-the-road accidents per million vehicle miles will be used. *(See Reference 2)*

c. Rumble strips should be considered for installation on new, reconstructed, or resurfaced shoulders of urban fully access-controlled highways and rural partially access-controlled multilane highways.

d. Rumble strips should be considered for use at certain critical locations, such as: approaches to narrow bridges, in gore areas, ahead of impact attenuators, next to concrete median barrier, and in areas with narrow clear zones.

e. Rumble strips may be used at other locations, where deemed to be a safety enhancement, at the discretion of the District Deputy Director. This decision should be based on a review and recommendation by the District Safety Review Team.

f. The use of rumble strips on local roads and streets in Federal-aid projects that are not on the National Highway System will be at the discretion of the responsible local agency.

2. IMPLEMENTATION

This policy will apply for all new construction, major reconstruction, and 3R projects on those facilities outlined above, for which detail design commences after this date. Districts are encouraged to incorporate the policy where feasible on projects currently under plan development. Rumble strips may be installed either as part of a capital construction project or by a separate retrofit project developed exclusively for this purpose. It is not intended that this policy apply to projects where plans have been completed, nor to projects that are under construction.

The design portions of this policy statement will be incorporated into the Location and Design Manual, Volume 1. Standard Construction Drawings (BP-9.1M and BP-9.2M) will be issued that will contain design details of rumble strips and show various options for their placement on shoulders. Proposal notes will initially be used to define all the construction methods and the bases of payment for rumble strips. These will eventually be incorporated into the Construction and Material Specifications.

This policy will be updated as necessary, based on information received from experience of usage, both in Ohio and around the nation. District personnel and contractors are encouraged to provide comments and suggestions for improvement.

3. DETAILS

a. Rumble strips are appropriate for use on either asphalt or concrete shoulders. They can be rolled into new asphalt shoulders (Type 1), milled into existing or new shoulders of either type (Type 2), or formed into new concrete shoulders (Type 3). *(See Attachments A-C and Reference 4)*

b. Of the three types of rumble strips, the milled-in pattern (Type 2) is the most effective, since it produces a vibratory, and audible, warning to drivers. It is the preferred treatment for use on most rural roadways. The rolled-in (Type 1) and formed-in (Type 3) patterns produce little vibratory effect and a less audible warning than the milled-in pattern and are therefore the recommended treatments for use in most urban areas and in all residential areas to minimize noise levels.

4. INSTALLATION GUIDELINES

a. Rumble strips should be installed on both shoulders (right and left) of divided roadways, but individual circumstances may dictate use on only one shoulder.

b. Rumble strips should only be installed on existing paved shoulders that are in good condition and have the following minimum widths for the specified type of rumble strip: 1 m (Type 1) and 0.7 m (Types 2 & 3). In asphalt shoulders, the asphalt should have a minimum thickness of 60 mm. They should not be placed on existing asphalt shoulders that have a high degree of deformation nor on shoulders with less than three years of useful life remaining.

c. Rumble strips should generally not be installed on shoulders that serve as peak hour travel lanes.

d. Where shoulders are to be used for maintenance of traffic purposes, rumble strips should be positioned to adapt to phase construction sequencing. *(See note 2 on BP-9.2M)*

e. Rumble strips generally should not be used on the shoulders of roadways designated as bicycle routes or having substantial volumes of bicycle traffic, unless the shoulder is wide enough to accommodate the rumble strips and still provide at least 1.0 m for bicyclists. Also, gaps should be provided in the rumble strip pattern ahead of intersections where bicyclists are likely to make left turns and to permit bicyclists to merge with traffic.

f. In built-up residential areas, noise generated by rumble strips could be objectionable. Where their use in such areas is warranted, the strips may be placed further from the edge of the traveled lane than shown in the details to reduce the frequency of the contact while still providing some degree of warning to drifting drivers. The distance from the edge of the traveled lane to the rumble strip pattern should not exceed 600 mm on the outside shoulder. Also, the use of either the rolled-in pattern (Type 1) or the formed-in pattern (Type 3) is preferable to the milled-in pattern (Type 2) in these areas.

g. It should be noted that the machinery used in the milling process requires a lateral clearance of at least 875 mm from the outside edge of the pattern to any obstruction (guardrail, a barrier, curbs, etc.).

5. MAINTENANCE

Rumble strips are reportedly a low-maintenance feature on roadways. *(See Reference 2, p 45)* They are generally considered to be "self-cleaning," i.e. accumulated debris is blown out by passing traffic.

a. On an annual basis, usually in the spring, the rumble strips should be checked for excessive accumulation of debris. If needed, the rumble strips shall be cleaned by either sweeping or blowing.

b. On projects where the shoulders are to be resurfaced either permanently or for maintenance of traffic conditions, the rumble strip pattern shall be restored on the new shoulder in accordance with this policy.

TRAINING:

None required. However, the Standards Section in the Office of Planning and Programming may be contacted for assistance in the application of this policy.

FISCAL ANALYSIS:

Because of their proven benefits, site-specific benefit-cost analyses for rumble strips are not necessary. *(See Reference 1)*

The estimated cost to install rumble strips on concrete shoulders is $7250/shoulder/kilometer. For rumble strips on asphalt shoulders it is $2550/shoulder/kilometer. It has been suggested that maintenance costs may be approximately $100 per linear kilometer. This cost along with other potential costs, such as for new equipment, have not been included in the fiscal analysis due to the current absence of data on which to base an estimate. We do not anticipate, however, that these costs will be substantial.

There are 6636.6 total centerline kilometers (4121.94 miles) of roadways in Ohio with four or more lanes. Assume the following: 1) it takes 15 years to resurface the entire system; therefore, 442.25 centerline kilometers are resurfaced each year, 2) there are four shoulders for every centerline and 3) 5% of the shoulders are concrete and 95% are asphalt. Based on these assumptions, the estimated annual costs to install rumble strips on concrete and asphalt shoulders are as follows

Rumble Strips on Concrete Shoulders
442.25 km/yr (4 shoulders)(.05)($7250/shoulder/kilometer) = $641,260/yr.

Rumble Strips on Asphalt Shoulders
442.25 km/yr (4 shoulders)(.95)($2550/shoulder/kilometer) = $4,285,400/yr.

Approved:

Effective: July 22, 1998
Responsible Office: Traffic Engineering
Policy No.: 516-002(P)

_____
Jerry Wray
Director

INSTALLATION OF TRAFFIC CONTROL SIGNALS AND INTERSECTION CONTROL BEACONS ON STATE HIGHWAYS

POLICY STATEMENT:

The Ohio Department of Transportation, herein referred to as Department, shall utilize uniform procedures for the installation of traffic control signals and intersection control beacons, herein referred to as traffic signals, on State highways. This policy supersedes Standard Operating Procedure OPS-211, Installation of Traffic Signals on State Highways, and OPS-233, Village Traffic Signal Permits.

AUTHORITY:

Sections 4511.10, 4511.11 and 4511.16 of the Ohio Revised Code (ORC).

REFERENCES:

1. Ohio Manual of Uniform Traffic Control Devices (OMUTCD)
2. Policy No. 516-001(P), Highway Safety Program
3. Department Construction and Material Specifications (CMS)
4. Section 5517.02 of the Ohio Revised Code (ORC)

SCOPE:

All Districts, Divisions and Offices of the Ohio Department of Transportation.

DEFINITIONS:

Signal Warrants: The standard warrants for installation of a traffic signal as set forth in the OMUTCD, Part 6.

Major Generators: Any development such as a shopping center, office park, factory, state park, etc., that would generate enough traffic to warrant installation of a traffic signal.

Minor Generators: Any development that would not generate sufficient traffic to warrant a traffic signal.

Private Road or Driveway: That approach to an intersection which serves a private development

and is not a dedicated public thoroughfare.

Electrical Energy Charges: Those actual charges for power consumed by the traffic signal devices whether metered or flat-rated as set forth by the power company providing the electric service.

Normal Maintenance: Repair and replacement of malfunctioning traffic signal components. This includes complete rebuilding of a traffic signal which has become obsolete or deteriorated through age.

Maintenance Charges: A fixed sum per year which is considered the average maintenance cost for a traffic signal as set forth by the Office of Traffic Engineering. It includes all normal maintenance to be performed on the traffic signal.

Traffic Engineering Study: See the OMUTCD, Section 6C-1.

Traffic Control Signal: See the OMUTCD, Section 6B-1.

Intersection Control Beacons: See the OMUTCD, Section 6B-3.

PROCEDURE STATEMENT:

At any location, including ramp terminals, on the rural state highway system or extension thereof, the Department may erect, maintain or remove a traffic signal upon the basis of a traffic engineering study. The justification of all such traffic signals shall comply with the requirements of the OMUTCD. The installation or removal of Department traffic signals shall be subject to the approval of the District Deputy Director.

I. DEPARTMENT PARTICIPATION AT TRAFFIC SIGNAL LOCATIONS

A. Municipalities

1. Where an intersection is partly within a municipal corporation, the Department may erect, operate and maintain a traffic signal and may include control of traffic on the approaches to the intersection that are within the municipal corporation, provided the municipal corporation agrees. Conversely, the Department may permit local authorities to erect, operate and maintain an approved traffic signal at an intersection on a State highway extension which is partly outside the municipal corporation. Generally, if more than half of the intersection pavement is outside the municipal corporation limits, the Department will install, operate and maintain any approved traffic signal. If half or more than half of the intersection pavement area is inside the municipal

corporation limits, the Department will not normally participate in the installation, operation and maintenance of a traffic signal, but will require a R/W access permit if any appurtenances are installed on State R/W.

2. In cases where the Department desires to install a traffic signal at a location partly within a municipal corporation, the municipality shall be asked to pass consent legislation agreeing to the installation and permitting access as may be required for installation and subsequent maintenance. The District shall transmit, to the municipality involved, information about the proposed traffic signal and specify items which should be covered in the consent legislation.

3. Upon notification of a municipality's intent to install a traffic signal at a location partially on a State highway, a letter of understanding shall be submitted to the municipality by the District indicating the Department's non-participation.

4. If proper operation of an authorized traffic signal requires that appurtenances, such as detectors or signs, be installed on an intersecting street or roadway under the jurisdiction of others, the District may install appurtenances after proper consent has been obtained from the local jurisdiction.

B. Interstate System in Cities And Villages

1. The Department may furnish, install and maintain traffic signals including the costs for electrical energy at the intersections of Interstate System ramp terminals and local streets when it is determined by the District that such signals are required to provide safe and efficient movement of traffic to and from said ramps.

2. If a proposed traffic signal requires special interconnection and/or coordination equipment for compatibility purposes with a city or village coordination system, an agreement may be executed between the Department and the municipality for the municipality to furnish, install and maintain the signal. Initial and subsequent changes in operation or timing of the signal and/or system must be approved by the District.

3. To ensure that the operation of Interstate System ramp signals which are part of a municipality's signal network will not adversely affect the operation of the Interstate System, the following procedure shall be followed:

   a. The proposed coordination network shall be designed to preclude back-up from the Interstate System ramps onto the mainline of the Interstate System.

b. The municipality shall implement traffic coordination patterns which will ensure the Interstate System ramp traffic operates at a level of service acceptable to the Department.

c. If an acceptable coordination system level of service cannot be obtained, the municipality and the Department should balance the delays between the ramps and the municipal street.

d. The District shall monitor the operation of the ramp signal after the coordination is implemented and shall request that the municipality reevaluate their coordination patterns if documented field observations indicate that the ramp traffic is experiencing substantial delays or if queues of vehicles interfere with the Interstate System flow.

e. The District shall have adequate legislation approved by the municipality to equally share the responsibility with the Department to achieve and monitor acceptable operation of the ramp traffic signals.

C. Limited Access Highways in Villages

At a public road intersection, including non-Interstate System ramp terminals, on a limited access State route extension within or partly within a village, the Department may erect a traffic signal upon the basis of a traffic engineering study. Before construction begins, a consent ordinance must be adopted by the village agreeing that the Department will furnish and install the traffic signal, and that the village will pay the costs for the electrical energy required to operate it and will operate the traffic signal in conformance with the village signal permit issued by the Department. The consent ordinance shall further state that the village will maintain the traffic signal at its expense or, with District concurrence, may pay an annual fee to the Department for its maintenance. The Department shall issue a signal permit identification tag and install it on the controller housing.

D. State Highways in Villages

On extensions of State highways inside incorporated villages, the Director will issue permits for the erection of traffic signals as required by Section 4511.11(c) of the ORC. When necessary, a consent ordinance by the village shall state that the village will pay for the electrical energy cost and will maintain the traffic signal at its expense or, with District concurrence, may pay an annual fee to the Department for its maintenance. The village shall install the signal at their cost. The Department shall issue a signal permit identification tag and install it on the controller housing.

E. Private Development Driveways

1. At an intersection of a rural State highway and driveway(s) serving a shopping center, industrial plant, industrial park, truck terminal or other private development, traffic signals may be erected and maintained by the Department upon the basis of a traffic engineering study. Before construction begins, a signal design plan must be prepared by the private owner(s) and approved by the Department, and an agreement must be signed by both the District Deputy Director and a legally responsible person representing the private ownership of the driveway(s) involved. This agreement shall designate responsibility for the installation, operation and maintenance of the traffic signal and its required appurtenances, including signs and pavement markings.

2. The Department may participate in the installation costs only if the traffic signal installation contract is sold through the Department. If the private owner(s) elects to hire a contractor, the private owner(s) shall pay all traffic signal installation costs, including labor, materials and equipment. Participation costs that are the responsibility of the private owner, as stated in Section I.E.3 below, shall be submitted as a cashier's check to the Department when the traffic signal agreement is returned to the District for signature. The check shall be payable to the Treasurer of the State of Ohio, c/o Ohio Department of Transportation. The amount shall be based on the Department’s estimate of the cost of the signal installation.

3. The private owner(s) shall participate according to the following conditions:

   a. <u>Major generator by itself with the driveway entering the State route to form a "T" intersection:</u> The private owner shall assume total construction costs plus total electrical energy and total maintenance charges.

   b. <u>Major generator by itself with the driveway entering the State highway opposite an existing public roadway where no traffic signal exists:</u> The private owner shall assume three-fourths of the construction costs, total electrical energy charges and three-fourths of the annual maintenance charges. The remaining charges are to be assumed by the Department, assuming that the roadway opposite the driveway does not meet traffic signal warrants under current operating conditions. If warrants are currently met for the roadway opposite the major generator's driveway, the private owner shall assume 50 percent of construction and maintenance costs and no electrical energy participation.

c. Major generator with driveway entering at an existing traffic signal: The private owner shall pay the total cost of the revision to accommodate the additional driveway approach traffic plus one-half of the annual maintenance charges. If maintenance charges for the existing signal are being paid by the private owner(s) of the original driveway, the annual maintenance charges shall be reduced accordingly through an addendum to the agreement(s). Payment of electrical energy charges may be negotiated between the private owners.

d. Minor generator with driveway entering at an existing traffic signal: The private owner shall pay the total cost of the revision plus one-fourth of the annual maintenance charges. If maintenance charges for the existing traffic signal are being paid by the private owner(s) of the original driveway, the annual maintenance charges shall be reduced accordingly through an addendum to the agreement(s). Payment of electrical energy charges may be negotiated between the private owners.

e. Two generators with driveways entering opposite each other to form a single intersection: Both private owners shall share in the total costs of construction, electrical energy charges and annual maintenance charges. It is preferred that both private owners in this case negotiate the percentages to which they would participate and the means by which electrical energy is provided.

4. When the need for a traffic signal (or a revision to an existing traffic signal) is determined as a result of the Highway Safety Program (HSP) Study (i.e., at a location which appears on the official HSP listing of Priority Locations), exceptions to the funding arrangements outlined in Items (a) through (e) above may be authorized by the District.

5. The agreement between the Department and the private owners shall grant to the Department the right-of-entry required to construct, operate and maintain the traffic signal and shall stipulate that its timing and operation is entirely the responsibility of the Department. The agreement shall also stipulate that the traffic signal will become the property of the Department once the traffic signal is constructed, inspected and accepted by the Department.

6. If installed by force account, the Department shall determine the cost of installation on the basis of current construction costs and the private owner(s) shall be required to pay this amount plus the current year's pro-rated maintenance fee. Such amount shall be deposited when the agreement is submitted to the District for signature.

7. If installed by contract, payment shall be in accordance with established procedures for contract work. The traffic signal agreement should be negotiated concurrently with the project plan development. All plans shall be approved by the District Deputy Director prior to release to the contractor. A completed traffic signal must be inspected and approved before acceptance by the District.

II. TRANSFER OF OWNERSHIP

A. Whenever the jurisdiction of a roadway passes from the Department to another governmental agency, the ownership and the responsibility for maintenance, electrical energy and record keeping of any traffic signal installation on that roadway passes from the Department to the governmental agency involved. An exception to this is a traffic signal installation at an Interstate System ramp terminal, where the Department may retain responsibility. In order to achieve the transfer, the District Highway Management Administrator shall contact the affected local agency and verbally ascertain its awareness and acceptance of the responsibility for the transferred traffic signal. The District shall then send a letter of transfer along with applicable prints, timing charts and electrical energy transfer confirmation to the agency involved and ask that a signed copy be returned for documentation.

B. If a city or village desires to install a traffic signal at their expense or to assume ownership of an existing State owned traffic signal for the purpose of adding to their coordination system, an agreement must be executed between the Department and the municipality for that transfer.

III. REMOVAL

Removal of a traffic signal under the jurisdiction of the Department shall be accomplished on the basis of a traffic engineering study and shall be at the expense of the Department.

IV. TEMPORARY TRAFFIC SIGNALS

Temporary traffic signals may be erected on the State highway system for construction, maintenance operations or emergency conditions by the District Deputy Director without the necessity of a formal traffic engineering study. A temporary traffic signal shall be removed when the construction, maintenance or emergency condition ceases.

V. SCHOOLS AND FIRE STATIONS

At an intersection of a State highway and a driveway serving a school or fire station, traffic signals may be erected and maintained by the Department upon the basis of a traffic engineering study. Before construction begins, an agreement must be signed by both the Department and the responsible public official. This standard agreement shall require that the public agency contribute 50 percent of the cost of installing the traffic signal and furnish all electrical energy required to operate it. The Department shall then maintain it.

VI. IMPLEMENTATION PROCEDURES

In carrying out this policy, the following procedures will apply:

A. Plans and Specifications

The District Deputy Director shall approve the plans and specifications for those traffic signals on the State Highway System covered by this policy.

B. Agreements

When an agreement is required between the Department and private owners or other agencies, the District shall prepare the agreement and/or a sample consent ordinance. Sample agreements are available on the "O" drive at O:\other\traffic\signals\agrments. These sample agreements have been reviewed by the Attorney General's Office and can be used without any review from the Office of Traffic Engineering. Any variations from the standard agreements shall require review by the Office of Traffic Engineering and, if necessary, the Attorney General's Office. Prior to the beginning of construction, the District shall negotiate the required agreement and obtain the consent legislation, if necessary. The plans for the traffic signal shall be made a part of the agreement by attachment or reference. Multiple copies of the agreement shall be signed and distributed, one for each party to the agreement. The District Deputy Director shall approve and sign the agreement for the Department. The Department's copy shall be retained in the District.

C. Village Traffic Signal Permits

The District shall be responsible for administering the village traffic signal permit procedures as described in Section 6A-5 of the OMUTCD. Approval of the traffic engineering studies, operational plans and signal permit forms shall be performed by the District. The District will send the Office of Traffic Engineering a copy of the permit document (TS-3) or the modification of the signal document (TS-4) so that a statewide database on village signal permits can be maintained.

D. Contractor Installed Traffic Signals

All traffic signals installed by this policy shall be inspected by the Department. Each traffic signal shall be inspected just prior to the ten-day performance test specified in Construction and Material Specifications 632.27(6). All other construction pay items shall be completed including the electrical tests specified in 632.27(1)-(4) and functional test specified in 632.27(5). The District shall coordinate the inspection at the project site with the contractor and maintaining agency representatives. Following the inspection, a list of all deficiencies shall be available to the involved parties upon request. Initiation of the ten-day performance test shall not proceed until all deficiencies of an operationally critical nature are corrected. Upon successful completion of the burn test, the maintaining agency shall be notified that the traffic signal construction is complete. The District shall notify the maintaining agency in writing that it is now responsible for maintenance.

Follow-up inspections should be made to verify the repair of electrical or functional deficiencies and the correction of other items such as grading of soil, missing manuals, lost nuts, etc. The District Deputy Director shall give final acceptance when the installation is completed satisfactorily.

E. Force Account Installed Traffic Signals

Force account installation work will normally be done by crews under the supervision of the District. The District will also arrange for the required electric power service and utility clearances and shall be responsible for placing the traffic signal in operation. To comply with cost limitations established for force account work in Section 5517.02 of the ORC, the District shall prepare a total cost estimate of the force account work. The District shall ensure that the installation is inspected for compliance with plans and specifications.

TRAINING:

None required.

FISCAL ANALYSIS:

Implementation of this policy will have no fiscal impact upon the Department. There is no additional cost to the Department as this is the current policy.

Intentionally Blank

Approved:

//s// Gordon Proctor
Gordon Proctor
Director

Effective: July 18, 2000
Responsible Office: Traffic Engineering
Policy No.: 516-003(P)

TRAFFIC MANAGEMENT IN WORK ZONES
INTERSTATE AND OTHER FREEWAYS

POLICY STATEMENT:

The Ohio Department of Transportation is committed to the continuous movement of traffic through all work zones by the elimination or reduction of delays. It is our goal to minimize the impacts on the traveling public resulting from the implementation of the work zone. Therefore, Districts shall analyze the projected effect of construction and force account projects on traffic flow and take the steps necessary to prevent traffic delays to the extent possible.

Compliance with this policy will benefit the traveling public, the construction industry and the business community by reducing work zone accidents and travel time. Because of its impact on project development, the determination and analysis of options for maintenance of traffic must occur at the beginning of the planning process as described herein.

This policy outlines the procedures to be followed and the parties responsible for its fulfillment. The Ohio Department of Transportation can waive mandatory conditions contained in the policy upon approval by the Assistant Director of Planning and Production and the Assistant Director of Highway Management based on sound engineering judgment.

AUTHORITY:

The Director of Transportation's authority to establish rules as conferred by 5501.02 of the Ohio Revised Code.

REFERENCES:

Work Zone Interstate Traffic Flow Improvements-September 8, 1995
Traffic Management in Work Zones (TMFWZ) website
(http://www.dot.state.oh.us/dist12/workzone/tmwz.htm#TRAFFIC IMPACT)
Project Communication Manual
Compendium of Options
IOC Traffic Management During Construction Activities - August 14, 1998
IOC Traffic Control Through Work Zones - April 12, 1999
IOC Traffic Management During Construction Activities - April 16, 1998
Highway Capacity Manual

Ohio Manual of Uniform Traffic Control Devices (OMUTCD)

SCOPE:

This policy applies to ODOT individuals involved in planning and performing work on interstate highways and other freeways, including District Planning, Production and Highway Management personnel, and County Managers.

Each District Deputy Director shall administer this policy.

BACKGROUND AND PURPOSE:

Construction and maintenance work continues to be a source of congestion on Ohio's interstate highways and other freeways. It is essential that all reasonable countermeasures to eliminate or reduce traffic delays in freeway work zones have been considered prior to implementation of the work zone.

The intent of this policy is to consolidate past work zone practices with new requirements to eliminate or reduce traffic delay caused by work zones. Guidelines will be established for developing and implementing a Traffic Management Plan for work zones. These plans will enhance our accountability and ensure that all options have been considered. Central to these plans is managing the capacity to maintain traffic flow. Ultimately this will enhance customer satisfaction while traveling through work zones.

Quality Assurance Reviews will be used to evaluate the District's compliance with this policy.

DEFINITIONS:

Conceptual Maintenance of Traffic (CMT)
A comparison of alternative work zone strategies, including but not limited to road user costs, construction costs and associated traffic queues for each alternative.

District Work Zone Traffic Manager (DWZTM)
The individual responsible for implementation of this policy in the District as well as the approved Traffic Management Plan.

Exception Request
The transmittal of the Conceptual Maintenance of Traffic to Central Office requesting approval of projected impacts of a work zone that exceed the allowable thresholds.

Freeway
An expressway with full access control and no at-grade intersections.

Highway Advisory Radio (HAR)
A limited range transmitter to broadcast real time traffic information reports that are too long or complex for either static or portable dynamic message signs.

Peak Hour
The period of highest hourly traffic counts during morning and/or evening rush hours, seasonal tourist and special events.

Permitted Lane Closure Map (PLCM)
A map and/or schedule of times lanes are permitted to be closed on Interstates and other freeways in a District.

Traffic Delay Study
A study to determine the amount of delay caused by the work zone.

Traffic Management Plan (TMP)
Overall strategy for accommodating traffic during construction and force account projects.

Travel Time Measurements
A measurement of time to travel a specific distance. Distances shall be total project limits plus expected length of queue.

Work Zone Incident Management
A mechanism by which the non contract related traffic disruptions are minimized through foresight. An example is the use of standby tow trucks or vehicles equipped with push bumpers on site or close at hand to minimize response time and reduce the effect which accidents or breakdowns could have on traffic flow. Such measures shall be approved by the appropriate Program Manager before they are incorporated in a project.

POLICY:

I. ORGANIZATION AND RESPONSIBILITIES

A. District Work Zone Traffic Manager (DWZTM)

1. This individual is appointed by the District Deputy Director. The DWZTM should possess a working knowledge of highway capacity theory; maintenance of traffic strategies and performance; ODOT manuals, standards and practices; and traffic flow modeling tools. Field experience on multi-lane construction projects is desirable.

2. The DWZTM will develop, maintain, distribute and provide guidance to District personnel, County Managers and consultants in the use of the Permitted Lane Closure Map (PLCM). This individual will revise the PLCM as needed to reflect current conditions.

3. The DWZTM will analyze any proposed lane closures on Interstates and other freeways that will be implemented outside the times allowed by the PLCM. This individual will be responsible for the development of the Traffic Management Plan. The DWZTM will submit the exception request to the Multi-Lane Coordinator for delays that exceed the allowable queue threshold.

4. The DWZTM will coordinate and monitor all projects that may affect traffic flow on Interstates and other freeways within a district. This individual will maintain communication with the DWZTM's in adjoining districts and advise them of potential impacts. The DWZTM will provide input during the development of the District Work Plan to avoid or minimize construction projects on alternate routes.

5. For any project approved by the Maintenance of Traffic Exception Committee, the DWZTM shall submit one copy of the Maintenance of Traffic Plans to the Multi-Lane Coordinator during detail design.

6. The DWZTM will coordinate with the District Public Information Officer to provide all information needed for the public relations campaign.

7. The DWZTM will ensure that permit work by local agencies on Interstates and other freeways complies with this policy.

B. County Managers

1. The County Manager will adhere to the lane closure time restrictions identified by the PLCM, except in case of an emergency.

2. The County Manager will advise the DWZTM of the need for force account lane closures outside the times permitted by the PLCM. Sufficient advance notice must be provided to the DWZTM to allow for an analysis to be performed and, if necessary, an exception request to be processed.

C. Multi-Lane Coordinator (MLC)

1. The MLC will review the exception request and solicit comments from other offices as needed.

2. The MLC will prepare a recommendation for approval or rejection and present it to the Maintenance of Traffic Exception Committee. This individual will advise the District of the committee's action typically within three weeks of receipt of the request.

D. Office of Traffic Engineering (OTE)

\ 1. The OTE will provide training for the development and updates of the PLCMs and for queue modeling upon District request.

2. OTE will assist Districts with the analysis of work zone alternatives upon request.

3. OTE will review and comment on Maintenance of Traffic Exception requests when asked by the Multi-Lane Coordinator.

4. OTE will perform field evaluations of this policy and prepare final reports through the QAR process for conformance to policy.

5. OTE, in conjunction with the DWZTM, will determine the cause of differences between the expected queue lengths from computer models and the actual queues generated by work zones. For projects where queues are generated which exceed the acceptable thresholds, OTE will perform travel time measurements through the work zone. This will allow the Department to begin

correlating queue length to travel time increases. The District PIO can then use predicted travel time increases and expected queue length in the public relations campaign.

6. OTE will conduct internal and external research to improve the Department's ability to accurately predict work zone impacts.

7. OTE will continually monitor and improve the analysis and process of this policy.

E. Maintenance of Traffic Exception Committee (MOTEC)

1. The Maintenance of Traffic Exception Committee will consist of the Assistant Director for Planning and Production, the Assistant Director for Highway Management and the Deputy Director for Highway Operations.

2. The committee will consider the exception requests and recommendation presented by the MLC, and will approve, reject or request additional information.

II. POLICY COMPLIANCE PROCESS

A. General

Each District shall prepare a PLCM that defines the allowable times a lane(s) may be closed on the Interstate/Freeway system within that District. Each District shall provide the OTE with the map if it is not available on the internet. Districts shall notify OTE of any revisions to their PLCM.

The District shall analyze the impact on the motoring public of any proposed lane closure not permitted by the PLCM as follows:

1. For contract work this analysis must occur during the planning process after the pavement recommendation has been formulated by the District Pavement Review Team and/or bridge work has been determined. In all cases analysis for contract projects shall occur before scoping of the final design begins.

2. For Design-Build projects the TMP must be completed, approved and reflected in the scope of services submitted to Central Office.

3. Analysis of permit or force account work zone impacts shall occur prior to the implementation of any lane restrictions.

In all cases a TMP will be formulated after completion and approval of the analysis.

B. Analysis

A quantitative analysis shall be performed to determine queues that will be generated any time a lane(s) closure is proposed outside of the PLCM allowable times, except in case of an emergency. Where queues are normally present even without lane closures, the analysis shall compare existing queues to expected queues caused by the lane closure(s). The allowable delay thresholds are defined in Appendix "A" (Queue Thuesholds). The process shall be as follows:

1. Contract and Design-Build Projects

a. Projected queue less than thresholds

The final development process may commence. Documentation of the analysis must be retained on file. The DWZTM must formulate the TMP. However, any work zone strategy chosen by the District that will result in impacts less than the allowable delay thresholds but increases the project cost by more than 20% or $5,000,000 shall be submitted to the MLC for approval. The Conceptual Maintenance of Traffic will be included with this submission.

b. Projected queue exceeds thresholds

The District shall submit an exception request to the MLC. The exception request will include the Conceptual Maintenance of Traffic submission and will identify the alternative selected by the District as their preferred option and the reasoning for their selection. The exception request will also address the impact to the District's programs and goals if the request is denied. The endorsement of the District Deputy Director must accompany the preferred option submitted by the DWZTM. The District is encouraged to include the MLC in the presentation of the alternatives considered to the District Deputy Director.

Upon receiving the exception request, the MLC will distribute it to appropriate Central Office specialty sections for review and comment. The MLC will prepare and present a recommendation for approval or rejection of the request to the MOTEC. The MOTEC will typically act within three weeks of receipt of the request by the MLC. The MOTEC may approve an alternative, reject all, or request additional information, and the MLC will report their action to the

DWZTM.

2. Force Account or Permit Work

   The process for approving force account and permit exception requests shall be the same as the process described above for contract work with one difference. The DWZTM may approve a TMP for queues greater than the allowable thresholds if the work will last no more than one day. The District PIO must be notified by the DWZTM even for one day closures.

   For work which will result in queues greater than the allowable thresholds and is considered by the District to be urgent in nature but not an emergency, the DWZTM may request an expedited review by the MOTEC. The MLC will accelerate processing of the exception request in accordance with the needs of the District.

C. Maintenance of Traffic Plan Submittals

For projects approved by the MOTEC, the District shall submit a copy of the Maintenance of Traffic plans during detail design to the MLC for information.

The District shall submit to the MLC for concurrent review a copy of the Maintenance of Traffic plans for any project with a construction cost exceeding $10,000,000. The purpose of this submission will be for design review comments, if desired by the District, and for validation of the analytical models. It is anticipated that the models will undergo continual validation as the technology evolves.

D. Traffic Management Plan (TMP)

The TMP will be completed for the strategy selected and should incorporate the following additional elements as applicable:

1. Consideration of stakeholders' needs during the decision-making process (see Appendix "C" Stake Holders)
2. Incident management strategies
3. Public relations campaign (see Appendix "E" Maintenance of Traffic in Construction Work Zones - Project Communication Planning and Appendix "F" Project Communication Manual)
4. Identification of alternate routes

E. Implementation and Evaluation

The DWZTM will be responsible for assuring that the TMP is implemented as approved. Implementation of the TMP will include the following functions:

1. Maintenance of Traffic plans will be verified for conformance with the approved TMP.

2. Work zone setup will be verified for conformance with the approved TMP as well as ODOT standards, policies and the Ohio Manual of Uniform Traffic Control Devices.

3. A contractor may submit an alternate Maintenance of Traffic plan for consideration by the DWZTM prior to the start of work. Work cannot begin until the alternate plan is approved. The alternate plan shall be processed for approval in accordance with the requirements for contract and design-build projects as specified in this policy.

4. Work zone queues shall be monitored and compared against the expected queues generated by the computer model. Unless the new work zone or construction phase causes extremely long queues, the queue measurements should be made about one week after a project or phase change begins in order to allow drivers to become accustomed to navigating the new conditions. Should the project generated queues measured after one week exceed the expected queue lengths, the DWZTM shall inform the MLC of the situation and of proposed corrective action. The cause for the discrepancy between the expected queues generated by the computer model and the actual conditions will be determined by the OTE in conjunction with the DWZTM.

TRAINING

The Office of Traffic Engineering will provide training in the development of the Permitted Lane Closure Maps, the use of queue modeling software, and work zone traffic control and inspection upon request.

FISCAL ANALYSIS

In order to satisfy customer demands to eliminate or reduce delays, the Ohio Department of Transportation will be required to accept some increases in project costs. The cost increases may include permanent lane additions and/or bridge widenings in order to comply with the policy. This may also involve completion of a Major Investment Study as well as early coordination with the Transportation Review Advisory Council to request Major New funding.

The cost increases associated with this policy and the corresponding impacts to District programs and goals will be evaluated on a project by project basis. The corresponding benefit will be the elimination or reduction of delays and road user cost.

List of Appendix

1. ***Appendix A***
   Queue Thuesholds

2. ***Appendix B***
   Compendium of Options

3. ***Appendix C***
   Stake Holders

4. ***Appendix D***
   OUEWZ -92 Program

5. ***Appendix E***
   Maintenance of Traffic in Construction Work Zones - Project Communication Planning

6. ***Appendix F***
   Project Communication Manual

Appendix A
Queue Thresholds

The criteria used to determine the impact of proposed work zones shall be queue length. The District may use Quewz-92, Synchro/Simtraffic, Corsim or similar programs to model the expected queues that will be generated. Multiple stages of construction shall be analyzed separately, if in the opinion of the DWZTM, there will be significant changes to the geometrics or operation of the work zone that would adversely affect the flow of traffic. The speed limit used in the computer models should be the posted legal construction zone speed limit. Volume data input into the models should be current (not older than three years), should account for seasonal traffic surges that may occur during construction, and should reflect current regional traffic patterns. Traffic volumes should be expanded to construction year levels through the use of growth factors provided by the Office of Technical Services.

Districts are encouraged to use a microscopic model (Synchro/Simtraffic, Corsim, etc.) for modeling of work zone queues. The effect of significant ramp merges on queues should be included in the model.

The following thresholds shall be used for the evaluation of project queue lengths as determined by the computer model:

1. For queues less than 0.75 miles, the work zone impacts are acceptable.

2. For queues greater than 0.75 miles and less than 1.5 miles, the work zone impacts are acceptable if the queue exceeds 0.75 miles for two hours or less. Where queues are expected to exceed 0.75 miles for any period of time, additional advanced work zone warning signing should be specified.

3. For queues longer than 0.75 miles for more than two hours or longer than 1.5 miles for any period of time, the work zone impacts are unacceptable. Alternate strategies shall be considered per the provisions of this policy.

4. A vehicle will be considered part of a queue if its average operating speed is approximately 10 mph or less. Discretion is required by the District personnel during both the analysis portion and field evaluation of the implemented work zone in determining what constitutes a queue. In general a condition that causes driver frustration due to stop and go operations should be considered a queue.

Appendix B
Compendium of Options

Options Summary

Construction/Traffic Maintenance Strategies

Part Width
Close & Detour
Crossover Construction
Temporary Pavements (Runaround)
Temporary Structures
Closure of 1-Direction of Mainline

Administrative Options

Traffic Management Program
Enforcement
Incident Management
Demand Management

Corridor Options Outside Work Zone

Temporary Signals
A + B Bidding
Lane Rental
Reversible Lanes
Movable Barrier Systems
Signed Alternate Routes
Unsigned Alternate Routes
Highway Advisory Radio
Advanced Signing (Time or Distance)

Contracting Procedures Options

Incentive/Disincentives

Traffic Flow Options Inside Work Zone

Temporary Pavements (Widen)
Use Existing Shoulders
Temporary Signals
Reversible Lanes
Ramp Closures
50" Barrier
Movable Barrier Systems
Highway Advisory Radio
Owner Imposed Design Restrictions
Use of Owner Supplied or Stockpiled Materials
Control of Contractor's Access to the Work

Time Limitations With Liquidated Damages Options

Temporary Lane Closures or Restrictions
Time Limitations
Night Work
Weekend Work (Only)
Lane Rental
Interim Completion Dates, By Phase

CONSTRUCTION STRATEGIES & WORK ZONE TRAFFIC CONTROL OPTIONS

CONSTRUCTION/TRAFFIC MAINTENANCE STRATEGIES					
Strategy & Objectives	**Pros**	**Cons**	**Restrictions**	**When to Use**	**Cost**
Part Width Construction	**Easier design** **Cheaper MOT cost** **No detour to follow** **Ramps can remain open**	**Contractor access interference** **May sacrifice quality** **More difficult to construct** **Narrow lanes and less safe** **Longer to construct** **Barrier could still be required for some dropoffs**	**Min-lane widths sometimes tough to obtain** **Conflict between width of roadway and width needed for work**	**When existing two lanes can remain with use of shoulder** **Minor work with short duration** **One lane may handle only 20,000 ADT with normal backup**	**This is the basis of comparison for alternate strategies, the "defacto" standard.**
Close & Detour **(Unusual on interstates and expressway routes)** **3**	**Safety/speeds up construction with full access** **Easier and better constr.** **No distracting traffic**	**Public can't get there the "usual" way** **Access to businesses** **Cost to motorist (time & fuel)** **Signing** **Lost motorists complaints/ damage of local roads**	**Short distance and ramp access** **Local agencies must accept detour and public information is emphasized (i.e. by TMP in urban area)** **Locations of ramps/intersections** **Detour must be adequately signed and may require capacity improvements**	**If it produces accelerated construction, alternates are available and drivers are fairly warned**	**CC↓, MTC↑, RUC↑** **Cheap if only signs are used; but will cost more if alternate route modifications are required** **detours- usually signed by ODOT**

Legend: Objectives 1 = Reduce Complaints, 2 = Maximize Corridor Capacity, 3 = Minimize duration of motorist inconvenience, 4 = Maximize motorist/work safety
Cost CC = Construction Cost, MTC = Maintenance of Traffic Cost, RUC = Road User Cost, ↑ = Cost Increase, ↓ = Cost Decrease; CC + MTC = Contract Cost

Strategy & Objectives	Pros	Cons	Restrictions	When to Use	Cost
Crossover Construction 3, 4	Safety for workers, familiarity of motorist Easier and better construction Wider traveled lanes If left in place useful in emergency Should increase contractor productivity Should increase quality Could reduce traffic interfer-ence as a result of increased contractor productivity leading to shorter phase completion dates are mandated	Ramp interference Cost Requires time for X-over construction and removal Long crossovers less acceptable in rolling to hilly terrain	Duration of project Location of x-over depends on ramp/lighting/structure/grade Phasing limits many impact use. Length of work zone may affect acceptability	Whenever possible, especially where not many ramps interfere. Long stretches of pavement reconstruction or rehabilitation Bridge work not conducive to keeping one lane open One lane each direction should handle about 30,000 ADT with limited backups	CC↓, MTC↑, RUC↓ Min. $¼ to ½ million per pair
Temporary Pavements (Runaround) 1, 2, 3, 4	Separates work from traffic	Expensive and time consuming while constructing Inefficient use of materials	Must have sufficient right-of-way	No adequate detour is available	MTC↑, RUC↓
Temporary Structures 1, 2 Allows closure of structure, but no detour for the public	Traffic remains on routes	Cost Time to design and construct Inefficient use of materials	Right-of-Way	When volumes warrant No detour available	MTC↑, RUC↓

Legend: Objectives 1 = Reduce Complaints, 2 = Maximize Corridor Capacity, 3 = Minimize duration of motorist inconvenience, 4 = Maximize motorist/work safety
Cost CC = Construction Cost, MTC = Maintenance of Traffic Cost, RUC = Road User Cost, ↑ = Cost Increase, ↓ = Cost Decrease; CC + MTC = Contract Cost

Strategy & Objectives	Pros	Cons	Restrictions	When to Use	Cost
<u>Detour of 1-Direction of Mainline</u> **(Assumes detour for closed direction)** **3, 4**	**Work moves faster** **Only ½ traffic detoured at anytime** **Improves safety of project personnel**	**Detour maintenance**	**Short distance and ramp access** **Local agencies must accept detour routes and public information is emphasized (i.e. by TMP in urban area)** **Locations of ramps/intersections** **Detour must be adequately signed and may require capacity improvements**	**Often Urban/suburban freeway is amenable to this when suitable detour is available**	**MTC↑ - Could require detour improvements**

Legend: Objectives 1 = Reduce Complaints, 2 = Maximize Corridor Capacity, 3 = Minimize duration of motorist inconvenience, 4 = Maximize motorist/work safety
Cost CC = Construction Cost, MTC = Maintenance of Traffic Cost, RUC = Road User Cost, ↑ = Cost Increase, ↓ = Cost Decrease; CC + MTC = Contract Cost

CORRIDOR OPTIONS OUTSIDE WORK ZONE

Option & Objectives	Pros	Cons	Restrictions	When to Use	Cost
Temporary Signals (At ramps and on expressways includes construction vehicle crossing and ramp metering) 1, 2, 4	Helps maintain ramp/detour capacity	Change traffic patterns on cross roads	Should be warranted	When additional capacity is needed for the short term	Low
Reversible Lanes (May use moveable barriers) 2	Flexible to accommodate fluctuations in traffic peak flow direction	Confusing to infrequent user. Labor intensive	Need majority commuting traffic	Large variances in directional volumes between AM & PM and # of lanes limited	MTC↑, RUC↓
Movable Barrier Systems 2, 3, 4	Ability to provide for peak flow capacity	More costly than drums and fixed barriers	Shift distance must be a constant Must determine appropriate end treatment	When you have a need for repeated barrier shifts	CC↑, RUC↓
Signed Alternate Routes (Eligible for Federal Money) 1, 2, 4	Reduces congestion Lessen congestion on mainline	Hard to get people to use Signing Not always used by public	Must be just as quick or close Shouldn't go through other construction zones Local officials must approve	With good arterials (parallel) When construction expected to backups Project is of long duration	Low cost unless alternate route improvements are required
Unsigned Alternate Routes (Not eligible for Federal money) (Logical unsigned alternate may be eligible for State money) 1, 2	Reduces congestion Lessen congestion on mainline	Difficult to get people to use	Alternate routes shouldn't go through other construction zones	When construction expected to produce backups and good parallel arterials are available	

Legend: Objectives 1 = Reduce Complaints, 2 = Maximize Corridor Capacity, 3 = Minimize duration of motorist inconvenience, 4 = Maximize motorist/work safety
Cost CC = Construction Cost, MTC = Maintenance of Traffic Cost, RUC = Road User Cost, ↑ = Cost Increase, ↓ = Cost Decrease; CC + MTC = Contract Cost

Option & Objectives	Pros	Cons	Restrictions	When to Use	Cost
Highway Advisory Radio **1**	**Provides real time information to motorists**	**Limited ranges** **Low usage rate by motorists due to difficult to tune in station**	**Information needs to be current** **May work best with repeat drivers** **Should be limited to project specific information**	**When alternate routes are available** **Long duration of construction**	**Low cost**
Advanced Signing (Time or Distance) **1, 2, 4**	**A great tool for information to motorists** **Gives public advance warning to make decisions**	**If project is delayed, sign is wrong**	**Need to keep information up to date**	**Anytime** **Advanced warning/PR is great always**	**Low cost for fixed** **Addition to MOT unless PCMS is used a $3000/mo**

Legend: Objectives 1 = Reduce Complaints, 2 = Maximize Corridor Capacity, 3 = Minimize duration of motorist inconvenience, 4 = Maximize motorist/work safety
Cost CC = Construction Cost, MTC = Maintenance of Traffic Cost, RUC = Road User Cost, ↑ = Cost Increase, ↓ = Cost Decrease; CC + MTC = Contract Cost

TRAFFIC FLOW OPTIONS INSIDE WORK ZONE

Option & Objectives	Pros	Cons	Restrictions	When to Use	Cost
Temporary Pavements (Widen) 1, 2, 4	Allows for more lanes to stay open Creates greater capacity thru constr. Zone - less back-ups	Expensive and time consuming while constructing	Bridges and other roadway items	When volumes warrant, keeping all lanes open When construction is expected to produce backups When Project is of long duration	MTC↑, RUC↓
Use Existing Shoulders 1, 2	Keeps flow normal Allows wider work area or increases capacity Low cost Quick	Requires more maintenance Trucks may damage weak shoulders No room for breakdowns/ emergency stops unless parking lots created Closer to guardrail/ embankment/piers	Must have full shoulder widths level bridges Bridges must be able to accommodate Put trucks in left lane if possible Must evaluate shoulders during design Should have full width approach slabs	High volume When backups expected Moving projects	
Temporary Signals (At ramps and on expressways includes construction vehicle crossing and ramp metering) 1, 2, 4	Helps maintain ramp/detour capacity	Change traffic patterns on cross roads	Should be warranted	When additional capacity is needed for the short term	Low
Reversible Lanes (May use moveable barriers) 2	Flexible to accommodate fluctuations in traffic peak flow direction	Confusing to infrequent user. Labor intensive	Need majority commuting traffic	Large variances in directional volumes between AM & PM and # of lanes limited	MTC↑, RUC↓

Legend: Objectives 1 = Reduce Complaints, 2 = Maximize Corridor Capacity, 3 = Minimize duration of motorist inconvenience, 4 = Maximize motorist/work safety
Cost CC = Construction Cost, MTC = Maintenance of Traffic Cost, RUC = Road User Cost, ↑ = Cost Increase, ↓ = Cost Decrease; CC + MTC = Contract Cost

Option & Objectives	Pros	Cons	Restrictions	When to Use	Cost
Movable Barrier Systems 2, 3, 4	Ability to provide for peak flow capacity	More costly than drums and fixed barriers	Shift distance must be a constant Must determine appropriate end treatment	When you have a need for repeated barrier shifts	MTC↑, RUC↓
Ramp Closures 2, 3, 4	Can pave/repair ramp full width Better, faster construction See "Close & Detour" Reduces mainline congestion Reduces cross road congestion Easy to sign in rural area	Blocks traffic pattern See "Close& Detour" Forces new traffic pattern Moves congestion elsewhere In urban area, may have negative impact on next intersection	Should give definite time limit See "Close & Detour" Best if only two ramps at a time (to/from directional pairs)	When other ramps are close by or when bridges on mainline are too close to utilize exit ramps/entrance ramps See "Close & Detour" Use when you have high traffic volumes In areas where alternate routes exists	Relatively cheap See "Close & Detour"
Glare/Gawk Screens 2, 4	Effective way to separate work and keep traffic moving Safer for work Reduce rubbernecking	Longer to set up than drums Higher cost than 32" Maintenance of glare screen, if used If present on both sides, may reduce drive speed Barrier can interfere with wideloads	Widths in certain areas Sight restrictions at intersections and ramps	When view of intense construction is likely to reduce capacity with all part width construction at restricted areas to control headlight glare	MTC↑
Highway Advisory Radio 1	Provides real time information to motorists	Limited ranges Low usage rate by motorists due to difficult to tune in station	Information needs to be current May work best with repeat drivers Should be limited to project specific information	When alternate routes are available Long duration of construction	RUC

Legend: Objectives 1 = Reduce Complaints, 2 = Maximize Corridor Capacity, 3 = Minimize duration of motorist inconvenience, 4 = Maximize motorist/work safety
Cost CC = Construction Cost, MTC = Maintenance of Traffic Cost, RUC = Road User Cost, ↑ = Cost Increase, ↓ = Cost Decrease; CC + MTC = Contract Cost

Option & Objectives	Pros	Cons	Restrictions	When to Use	Cost
Owner Imposed Design Restrictions **1, 3**	**Can reduce actual construction duration**	**Requires advance planning during design;** **could increase cost**		**For certain time critical phases**	
Use of Owner Supplied or Stockpiled Materials **1, 3**	**Can reduce actual construction duration**	**Requires advance planning**		**For time critical phases to shorten duration**	**Inexpensive**
Control of Contractor's Access to the Work **(By location or time of day.)** **2, 4**	**Eliminates potential conflicts between construction traffic and motorist** **Improves through put of motorists**	**May reduce contractor productivity**	**Must provide reasonable access for contractor**	**Where capacity is critical, where conflicts between contractor's equipment and motorists is expected to impact capacity and safety possibly on grades or locations with poor sight distances**	**CC↑, RUC↓**

Legend: Objectives 1 = Reduce Complaints, 2 = Maximize Corridor Capacity, 3 = Minimize duration of motorist inconvenience, 4 = Maximize motorist/work safety
Cost CC = Construction Cost, MTC = Maintenance of Traffic Cost, RUC = Road User Cost, ↑ = Cost Increase, ↓ = Cost Decrease; CC + MTC = Contract Cost

TIME LIMITATIONS WITH LIQUIDATED DAMAGES OPTIONS

Option & Objectives	Pros	Cons	Restrictions	When to Use	Cost
Temporary Lane Closures or Restrictions 1, 2	Prevents contractor from keeping lanes closed longer than necessary Prevents work during specified hour	May surprise repeat drivers May be more expensive More setups and take downs which can reduce construction time	Rush hour considerations Use only if work will allow Give public notices	Mainline paving on basic freeway lanes When desired to prohibit closures during specified times	CC↑, MTC↑, RUC↓ Cheap (Cone - Day) (Drums - Night) Possibly higher cost than permanent closure
Night Work (Hours of day a specific phase of work is or required to be performed) 2, 3	Good PR Lower cost to motorist May shorten project duration	Costly for labor Lower efficiency Personnel are isolated Possible poorer quality work and inspection difficulty Difficult to get some materials at night Increased hazard potential Difficult access to manage-ment/supervision for problem solution	Residential areas Work must be able to be accomplished in this time Urban noise ordinances	High volume areas When extensive backups expected to be created	CC↑, MTC↑, RUC↓
Weekend Work (Only) 2, 3, 4	Lower cost to motorist	Costly/needs inspection on overtime also Impacts traveler who is less familiar with alternate routes Difficult to get some materials on weekends	Work must be able to be accomplished in this time	More amenable in urban areas High volume of commuter traffic expected to be delayed	CC↑, RUC↓

Legend: Objectives 1 = Reduce Complaints, 2 = Maximize Corridor Capacity, 3 = Minimize duration of motorist inconvenience, 4 = Maximize motorist/work safety
Cost CC = Construction Cost, MTC = Maintenance of Traffic Cost, RUC = Road User Cost, ↑ = Cost Increase, ↓ = Cost Decrease; CC + MTC = Contract Cost

Option & Objectives	Pros	Cons	Restrictions	When to Use	Cost
Lane Rental **(Many variations)** **(Contractor loses money for duration of specific lane closures)** **1, 2, 3**	**Work done in the most cost effective and timely manner** **Should minimize construction time** **Provides incentive to minimize use of road space**	**Expect disagreements** **New application in Ohio**	**Requires careful timekeeping** **Too many variables**	**Paving freeways**	**CC↑, RUC↓**
Interim Completion Dates, By Phase **3 (possibly 4)**	**A good tool for timeliness** **Prevents contractor from having lanes closed or restricted when not desired**	**Only works if enforced by increased liquidated damages**	**Schools, weather, plowing, etc.** **Must require early considera-tion and follow-up** **Must be updated when a sale date is established or revised**	**To open roads before winter, specified events**	**Cheap**

Legend: Objectives 1 = Reduce Complaints, 2 = Maximize Corridor Capacity, 3 = Minimize duration of motorist inconvenience, 4 = Maximize motorist/work safety
Cost CC = Construction Cost, MTC = Maintenance of Traffic Cost, RUC = Road User Cost, ↑ = Cost Increase, ↓ = Cost Decrease; CC + MTC = Contract Cost

CONTRACTING PROCEDURE OPTIONS					
Option & Objectives	**Pros**	**Cons**	**Restrictions**	**When to Use**	**Cost**
Incentive/Disincentives (Usually applies to a phase of a project.) 1, 3	Timeliness Quicker construction	More arguments on time extension Our people must resolve issues quickly Requires CPM schedule	None known Need good plans and a project with the work well defined in advance Work must be able to be accomplished in allotted time - must follow I-D policy	High volume that truly impacts motorists without good detour or alternate route	CC↑, RUC↓ Must budget for maximum incentive
A + B Bidding (Construction cost plus construction time.) 1, 3	Work done in the most cost effective and timely manner Should minimize construction time	May pay more for the work Expect disagreements	Limit to high impact projects currently limited to test projects Need very good plans and no expected changes Need reasonable completion times	High volume that truly impacts motorists without good detour or alternate route	CC↑, RUC↓
Lane Rental (Many variations) (May be combined with A&B Bidding) (Contractor loses money for duration of specific lane closures) 1, 2, 3	Work done in the most cost effective and timely manner Should minimize construction time Provides incentive to minimize use of road space	Expect disagreements New application in Ohio	Requires careful timekeeping	Paving freeways	CC↑, RUC↓

Legend: Objectives 1 = Reduce Complaints, 2 = Maximize Corridor Capacity, 3 = Minimize duration of motorist inconvenience, 4 = Maximize motorist/work safety
Cost CC = Construction Cost, MTC = Maintenance of Traffic Cost, RUC = Road User Cost, ↑ = Cost Increase, ↓ = Cost Decrease; CC + MTC = Contract Cost

ADMINISTRATIVE OPTIONS					
Option & Objectives	**Pros**	**Cons**	**Restrictions**	**When to Use**	**Cost**
Traffic Management Program (Area, corridor or project) (May include enforcement, demand management, public info., public perception adjustment) 1, 2, 4	Keeps checks on conflicts Helps with consistency Coordinates all projects develops a forum for discussion of construction problems	Not welcomed by some Takes extra time and planning Tend to be expensive Additional funding required from Districts and Locals Project outside area boundaries may cause public relation problems/ requires more staff time	Takes extra time and planning Area must be large enough to make worthwhile	Anytime Most often used in larger urban areas and particularly (8 MPO's) with large projects	CC↑, MTC↑, RUC↓ Personnel only (Mainly) Typical program is $500,000 to $1 million/year
Enforcement 1, 2, 4	Expedited, orderly traffic flow, incident support	Cost		When incident support is required or enforcement presence is desired	Medium high
Incident Management 1, 2, 3, 4	Minimizes effect incidents have on traffic flow	Cost of standby incident response personnel and vehicles administrative cost		Freeway sections with high v/c ratio and high likelihood of incidents	High
Demand Management 1, 2, 3, 4	Shifts some demand from highway under construction Good PR	Requires advance planning and coordination Cost	Alternative routes and modes must be available	Large urban/suburban projects in congested corridor	High
Contractor Proposed Options 3	May result in shorter construction duration	Contractor may not be as familiar with recommended procedure as claimed Usually requires rush reviews by ODOT	Requires adequate lead time for PR and permits		CC↓

Definitions

A + B BIDDING - the contractor bids the cost of work ("A") and the number of days that will be required to complete the project. The time cost ("B") is established by multiplying the time by a set rate based on roadway user costs. These two "costs" are then added together to determine the lowest total bid for the project.

ADVANCE SIGNING - signing is displayed well in advance (either distance or time) in order to clearly communicate what to expect in the work zone and to offer options to the motorist. When displaying distance, these signs are placed in addition to those signs specified in MT series of Standard Drawings. They are placed far enough in advance of the project to warn approaching motorists of the work zone and to permit the selection of an alternate route.

CLOSE & DETOUR - all through traffic is completely banned from the roadway under construction. Through traffic is rerouted on other designated routes. Closures can range from 24 hours a day, seven days a week for a phase or the entire duration of the project to limited times such as nights, weekends, specified hours during the day, etc.

CLOSURE OF ONE DIRECTION OF THE MAINLINE - the complete closure of one direction of the roadway with that traffic being diverted to other detour routes.

CONTRACTOR-PROVIDED OPTIONS - allows the contractor to propose changes in construction strategy and maintenance of traffic. This method takes advantage of the contractor's construction knowledge and special capabilities and can result in shortened contract time.

CONTROL OF CONTRACTOR'S ACCESS TO THE WORK - project documents clearly spell out where and when the contractor can and cannot enter and/or exit the work site from the lanes that are available for through traffic. Examples of such control are: specified ingress/egress from adjacent routes, limits on timing such as during non-peak hours, limiting the number of breaks in temporary concrete barriers, etc.

CONSTRUCTION CROSSOVERS - involves the routing of one direction of traffic across the median to the opposite lanes. If the shoulder/temporary pavement is not used for through lanes, the number of travel lanes in each direction is reduced.

DEMAND MANAGEMENT - through traffic is reduced through establishment of HOV lanes, mass transit, ride-sharing programs, and/or employer cooperation. Park-and-ride lots are created or expanded. Mass transit service is either modified or established within the corridor via the use of schedule changes and/or additional local or express service. Ride-sharing is promoted through the creation of van- and/or car-pools. HOV lanes are established to move mass transit vehicles, van- and car-pools through the corridor. Employers (usually, but not limited to, large) are contacted for support via adjustments to employees work schedules (staggered starting times, compressed work schedules, telecommuting, etc.) and for support of the mass transit and ride-sharing programs.

ENFORCEMENT - law enforcement officers (LEO's) paid to specifically patrol the work zone to ensure speed compliance and provide emergency response support with the zone. The LEO's can be used on alternate routes during peak hours.

GLARE/GAWK SCREEN - the use of vertical panels or screening on the top of 32" or 50" high portable or permanent median barriers. This practice prevents the blinding of most motorists by headlights from opposing traffic (glare), and restricts the ability of motorists on one side from viewing construction activity on the other side (gawk).

HIGHWAY ADVISORY RADIO - a limited range transmitter to broadcast real time traffic information reports that are too long or complex for either static or portable changeable message signs.

INCIDENT MANAGEMENT - a mechanism by which the non-contract related traffic disruptions are minimized through contracting agency foresight. An example is the use of to have standby tow trucks or vehicles equipped with push bumpers on site or close at hand to minimize response time and reduce the effect which accidents or breakdowns could have on traffic flow.

INCENTIVE/DISINCENTIVE - rewards (incentive) the contractor for completing the work ahead of schedule and assesses deductions (disincentive) to the contractor for not meeting the completion date.

INTERIM COMPLETION DATES - a specified date or duration of time by which a phase of the project must be completed.

LANE RENTAL - a charge to the contractor which is assessed whenever the contractor has a portion of the roadway obstructed. The rental charge is usually based upon road user costs for the number/configuration/length of lanes closed, the time of day the closure occurs, and the duration of the closure. The rental charge can vary within a project (i.e., one lane closed for ½ hour at rush hour could cost more than one lane closed for four hours at night). The contractor includes an estimate for the total lane rental charge for the project in the bid.

MOVABLE BARRIER SYSTEMS - a mechanical system by which temporary, portable, concrete barriers can be moved quickly to provide additional work space for the contractor during off-peak hours or to provide an increase in the number of lanes to accommodate peak traffic flow periods.

OWNER IMPOSED DESIGN RESTRICTION - construction contractors can be structured to require the contractor to perform specific activities or operations in a manner which minimizes disruption to traffic.

NIGHT WORK - certain phases, or perhaps the entire project, are required to be performed at night to reduce interference with normal daytime traffic volumes. Night is usually defined as beginning at the end of the evening rush hours and ending at the beginning of the following morning rush hours.

PART WIDTH CONSTRUCTION - one or more normal traffic lanes are closed for the work zone. The remaining lane(s) may or may not have width restrictions. This is considered ODOT's "de facto" options against which all other options are measured.

RAMP CLOSURES - complete closure of either, or both, entrance and exit ramps to provide smoother flow on the mainline, to encourage local traffic to use alternate routes, and/or expedite work on the ramp.

REVERSIBLE LANES - an existing lane or lanes that may be assigned a reversible role to accommodate the predominant flow of traffic within the corridor.

SIGNED ALTERNATE ROUTE - an attempt to give the public a possibly less congested routing through the corridor while maintaining traffic on the mainline through the work zone. As with a detour route, this usually involves a cost to the contracting agency for maintenance of the route.

TEMPORARY LANE CLOSURES/RESTRICTIONS - the contractor may utilize a traveled lane only during specified times. The contractor must complete the necessary work in the lane and re-open the lane by the specified time.

TEMPORARY PAVEMENTS (RUNAROUND) - a temporary roadway that is constructed parallel to the work zone within the right-of-way. The temporary roadway is used as a detour within the corridor when the mainline is closed.

TEMPORARY PAVEMENTS (WIDENING) - pavement is added adjacent to the existing roadway in order to maximize the number of lanes available during construction.

TEMPORARY SIGNALS - traffic signals are installed on entrance and exit ramps, and along detour routes to provide priority travel for through traffic.

TEMPORARY STRUCTURES - an appropriately sized adjacent structure is erected for the duration of the construction project only. All traffic is shifted to this

new structure to permit complete closure of the existing structure without detouring traffic to another route. This additional structure is removed once construction on the existing structure is complete.

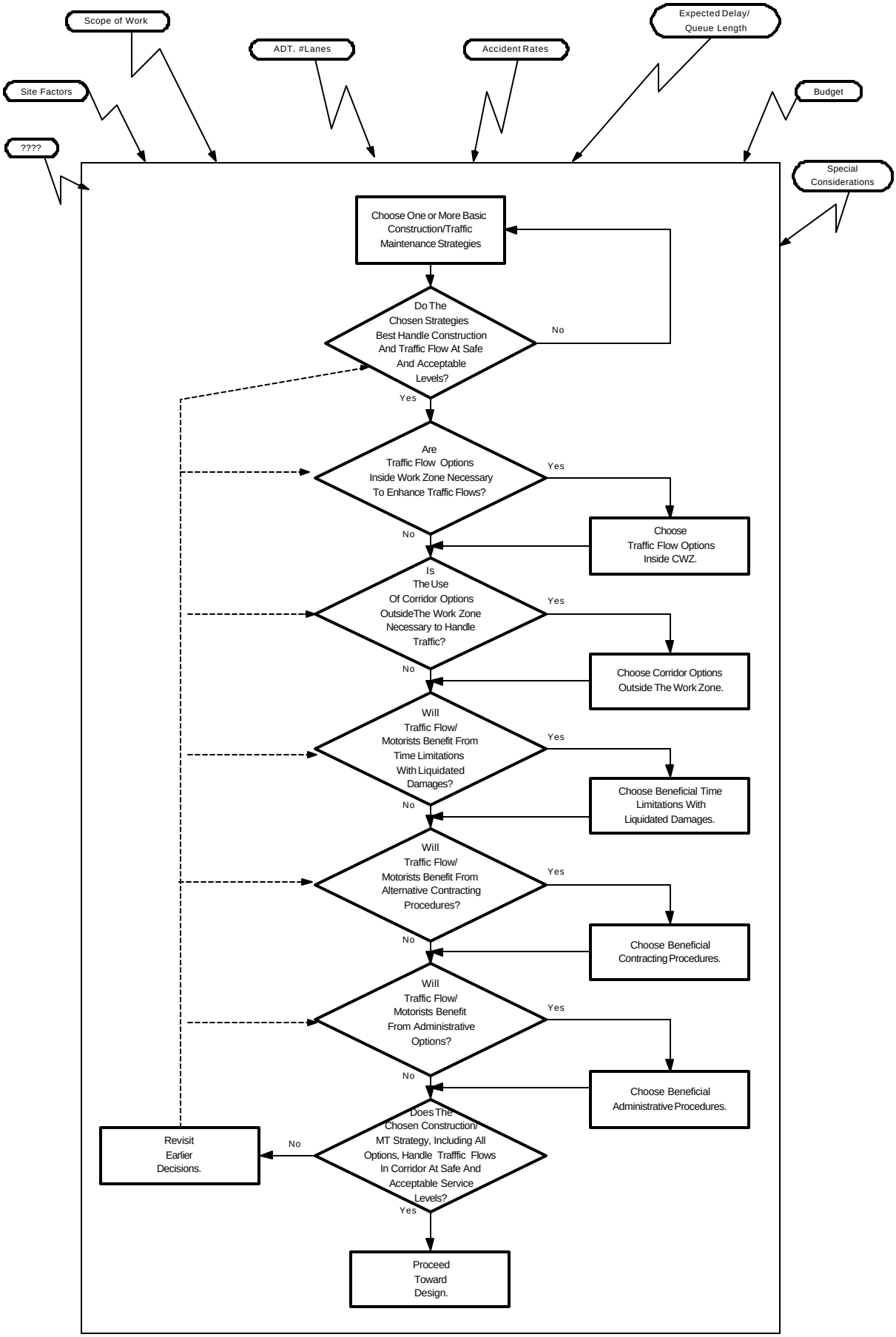
TRAFFIC MANAGEMENT PROGRAM (TMP) - the use of a multi-faceted and multi-jurisdictional program of operational, communications, and demand management strategies to maintain acceptable levels of traffic flow during periods of construction activities. Typically, TMP's consist of elements from each of the following areas: Public Information, Motorist Information, Incident Management, Construction Strategies, Demand Management Strategies, and Alternate Route Strategies. A TMP can be used for either single projects or for coordination of multiple projects within a given area.

UNSIGNED ALTERNATE ROUTES - the use of transportation system management-type improvements on streets, highways, and freeways in and adjacent to the construction corridor to augment the overall corridor capacity. Unsigned alternate routes may benefit from such improvements as signal re-timing and coordination as well as operational changes including parking and turning restrictions.

USE OF OWNER-SUPPLIED OR STOCKPILED MATERIALS - the shortening of actual construction time by having the project owner provide critical, hard-to-get materials with unpredictable delivery schedules. Such material can be obtained and stockpiled for ready use either by the owner, or through preceding projects.

USING EXISTING SHOULDERS - this involves using the existing shoulder(s) as a part of the traveled portion of the roadway, with or without upgrading the shoulder pavement to the anticipated traffic loads.

WEEKEND WORK - a method of restricting certain phases or all work to weekends (off peak hours). This is usually defined as beginning at the end of evening rush hours on a Friday and ending at the beginning of morning rush hours on the following Monday.


Scope of Work
ADT. #Lanes
Accident Rates
Expected Delay/ Queue Length
Site Factors
Budget
????
Special Considerations
Choose One or More Basic Construction/Traffic Maintenance Strategies
Do The Chosen Strategies Best Handle Construction And Traffic Flow At Safe And Acceptable Levels?
No
Yes
Are Traffic Flow Options Inside Work Zone Necessary To Enhance Traffic Flows?
Yes
Choose Traffic Flow Options Inside CWZ.
No
Is The Use Of Corridor Options OutsideThe Work Zone Necessary to Handle Traffic?
Yes
Choose Corridor Options Outside The Work Zone.
No
Will Traffic Flow/ Motorists Benefit From Time Limitations With Liquidated Damages?
Yes
Choose Beneficial Time Limitations With Liquidated Damages.
No
Will Traffic Flow/ Motorists Benefit From Alternative Contracting Procedures?
Yes
Choose Beneficial Contracting Procedures.
No
Will Traffic Flow/ Motorists Benefit From Administrative Options?
Yes
Choose Beneficial Administrative Procedures.
No
Does The Chosen Construction/ MT Strategy, Including All Options, Handle Trafffic Flows In Corridor At Safe And Acceptable Service Levels?
No
Revisit Earlier Decisions.
Yes
Proceed Toward Design.

Appendix C
Stake Holders

Stake holder is a term applied to individuals, groups and organizations who have a "stake" in a highway improvement project. They may be immediately affected by the project because they must travel through the construction work zone. They may be more indirectly involved because of their position in the community or their job responsibilities are affected. They all share the status of "need to know."

The traveling public is of course *the* important stake holder. Motorists are most affected by highway improvement. They enjoy the new highway or the resurfaced highway once the project is completed and they are the ones inconvenienced when caught in the construction zone. They are also the ones ultimately paying for the improvements when they fill their vehicle's tank. They are by far, the largest and most important group a highway improvement project communication plan needs to target.

Major businesses in and around a project work zone are traffic generators. Employees going to and from work may travel though the zone daily. Deliveries to the businesses can create slower moving truck traffic and the timely arrival of some deliveries can be critical to some operations using JIT, just-in-time deliveries. Manufacturing and warehouse businesses also use trucking operations to transport products and goods to their customers. Informing the plant manager or business manager before construction starts not only builds good will but enables them to inform employees and adjust delivery and transport schedules.

Other businesses located in the immediate area of a construction project may not be major employers but may be traffic generators. Customers going to supermarkets and shoppers going to the local mall add to the traffic volumes. The proprietors may be concerned about the construction project interfering or limiting customer access and the resulting loss of business. Being in the communication loop will reassure them and allow them to let their customers and employees know what to expect.

There are other stake holders or stake holder groups who may not be directly affected by highway improvement but who should be considered when doing the construction project's communication plan. The stake holders may not be located near the work zone. They may not be traffic generators. As individuals, they may not even travel through the work zone or in anyway be inconvenienced. However, because of their position, they need to be informed. It may be as simple as sending them copies of news releases or composing a letter.

Local government officials, such as mayors, city managers, city council members, county commissioners and county engineers need to be informed in order to deflect complaints and feel part of the project. It is better to have them as allies. The people in these positions are after all elected officials.

Emergency services and law enforcement agencies have a "need to know" about highway improvement in their service areas. Often it is a matter of sending news releases to law enforcement headquarters and emergency 911 operations centers.

Appendix C
Stake Holders

Legislators at both the state and federal level often have an interest in highway projects in their respective districts. In some cases they have been involved with project funding or they have helped promote the need for projects. State legislators, using the legislative process, develop the state's transportation budget. At the national level, members of congress help decide funding and national transportation policy. An informed legislator is much more likely to answer a constituent's complaint about highway improvement in a positive tone. Also keep in mind that legislators may be interested in participating in a project's ground-breaking or ribbon-cutting event.

Transit authorities are very important stake holders, especially in urban areas when the roadway is closed and the zone has restricted lane widths. The project can cause delays in the timing for picking up commuters and rerouting buses. In some cases sidewalk improvements may affect bus shelters or pick up areas. Informing the agencies about project start dates, maintenance of traffic plans and an expected completion date is very important. On major projects transit authorities are often contacted in the design process but keeping them up to date with progress is important.

Utility companies are another stake holder that is often contacted during the design process if necessary. But keeping appropriate utility company personnel up to date on the highway improvement project will help promote the image for all parties.

Keep in mind that construction may create some special needs to contact specific individuals or organizations. The **postmaster** may need to reroute mail delivery due to a road closure or inability to access rural mail boxes. **Convention and visitor's bureaus** should have construction information to pass on to meeting planners. **Promoters and managers of special events** (local festivals, street fairs, county fairs, etc.), **entertainment venues and amusement parks** need to understand that construction could affect customer access. Look for opportunities to share construction information with **travel clubs**, such as the American Automobile Association.

Developing an all-inclusive list of stake holders who have a need to know about any given highway improvement project is dependent on the type of construction, the extent of construction, the length of the construction zone and how long the construction is expected to take. When planning communication for a construction project, consider the construction zone's geography, business and residential environment in order to begin the development of a specific list of stake holders who need information on the construction project. Remember, an informed group of stake holders not only builds good will and lessens the complaints, but the stake holders in turn become communicators to their constituents. Well planned and targeted communication will ensure a positive message is forwarded.

Appendix D
OUEWZ -92 Program

On freeway projects, the Department uses the computer program QUEWZ to determine the queues and user costs that are associated with work zone lane closures. Based on the type of lane closures, traffic volumes, time schedules, etc., the program will provide the user with the expected queue length and estimated user costs.. The designer may use this program to ensure the proposed traffic control plan is still cost effective. The program user should review the user's manual to determine how to use the program.

Inputs

The user must provide the following inputs into the program:

1. lane closure configurations,
2. the schedule of work activities (e.g., work activity hours, lane constriction hours), and
3. the traffic volumes approaching the freeway segment.

The program provides default values for:

1 cost update factor,
2. percentage of trucks,
3 speeds and volumes at various points on a speed-volume curve,
4. capacity of a lane in the work zone,
5. maximum acceptable delay to motorist, and
6. critical length of queue.

To obtain meaningful results, the designer should consider revising the default values to meet the site location. For example, it should be noted that the program assumes that for queues longer than 20 minutes that some drivers will divert. To account for actual queues and the corresponding user costs, the designer may need to adjust the 20-minute time frame to meet the project situation. The designer should review the user's manual to determine if the default values are applicable to the location under consideration.

Outputs

QUEWZ has two output options - road user cost and lane closure schedule. The road user cost output option analyzes a specified lane closure configuration and schedule of work activities and provides estimates of traffic volumes, capacities, speeds, queue lengths, diverted traffic and additional road user costs for each hour affected by the lane closure. The lane closure schedule option summarizes the hours of the day when a given number of lanes can be closed without causing excessive queuing.

Appendix D
OUEWZ -92 Program

In addition to the values obtained from the program, supplemental user cost calculations may be required where changes are expected based on existing traffic patterns and volumes. Supplemental claculations for detours are typically required where an exit or entrance ramp within the construction zone (including those using crossovers) will be closed and where the designer judges that the QUEWZ program is not properly estimating the full amount of diverting mainline traffic

Experience has shown that additional detour user cost calculations should be conducted for the following:

1. Where exit ramps are closed. Experience has shown that most or all of this traffic will divert from the mainline before the construction zone. Therefore, the exit ramp volumes should be deleted from the input mainline volumes before using QUEWZ and appropriate detour calculations performed.

2. Closed entrance ramps may or may not lead to changes in the input values for QUEWZ. Additional detour calculations will be required for any expected diversions.

Appendix E
Maintenance of Traffic in Construction Work Zones

Project Communications Planning

Construction project communications plans are a cooperative effort of the district PIO, the district Planning and Production administrators, the contractor's project manager, and the ODOT project engineer. Construction communications plans should be developed well in advance of the start date of a project, as much of the communications must be undertaken prior to the construction phase. Therefore, commencement of the communications plan should begin when the preliminary maintenance of traffic plan is developed during the design phase.

Checklist for Project Communications Plan
Each project communications plan should consist of the following elements:

1. Brief summary of project (situation analysis)
   a.Project purpose and need
   b.Project cost and funding source breakdown
   c.Completion date
   d.Maintenance of traffic plan. Begin with conceptual plan and update as plan develops.
   e.Closures and detours
   i.Official detour
   ii.Expected local detours (to be released to local officials only)
   iii.Time of day for lane drops and closures

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Maintenance of Traffic in Construction Work Zones

2. List of affected stakeholders to be targeted

    a.Municipalities, counties, townships, villages and MPOs
    b.Local and state law enforcement
    c.Emergency services
    d.Affected business community
    e.Schools

3. Actual communications plan and timeline for each aspect

    a.Standard communications tools
    b.Project-specific communications tools
    c.Contact information for person responsible for each aspect

4. Schedule of communications status updates to DDD, DD of Communications, etc.

5. Means of evaluation of communications plan

    a.In-progress
    b.Post-construction

Some examples of communications tools are listed below. Tools one through six should be considered a minimum standard for any major construction project. The remainder of the tools can also serve to significantly aid a project communications plan, as deemed appropriate.

<u>Communications Tools:</u>

1. Press releases, media alerts, public service announcements
2. Focus group/stakeholder meetings
3. Brochures, maps
4. Public involvement meetings
5. Editorial board meetings
6. OTIS posting
7. Dedicated project Web page (I-70.org)

Appendix E
Maintenance of Traffic in Construction Work Zones

8. Changeable message board communications
9. Community and group informational talks
10. Local government and legislator meetings
11. Dedicated phone number for information (district PIO line or other)
12. Targeting tourist areas with maps and brochures (hotels, restaurants, chambers, visitor centers, etc.)
13. Business letters/brochures/maps packets to major businesses affected (hospitals, colleges, large corps)
14. Business letters to any company along a ramp or route closing (Ex: SR 256 - businesses claimed they were not given enough warning)
15. Dedicated am-band radio station with construction info on loop
16. Billboards along affected routes
17. Post "future detour" signs to allow motorists to become familiar with the route
18. Regular updates to trucking companies and largest freight carriers in area

Appendix F
Project Communication Manual

Introduction

This manual was conceived as a tool to advise contractors' highway improvement project managers and the Ohio Department of Transportation (ODOT) project engineers on the importance of communicating, in some detail, the start, progress and completion of highway projects. The manual is intended to be a guide to the use of communication tools targeting various groups who need to know about highway improvement projects.

Communicating the details of highway improvement projects is desirable, and it is necessary. The traveling public, the affected business person, the school bus driver and community leader all have a right to know when and how a construction project will impact their lives. An informed group of stake holders will help the communication process while adding to the safety of the work zone.

Recent surveys indicate that motorists expect to be provided with advance information about construction. Commuters express a strong need to be informed about road construction, so they can make the necessary preparations to deal with it. The driving public has accepted the facts that there will be major highway improvement projects every construction season. However, it is the unexpected, unannounced construction projects and the related lane closures, detours and delays that frustrate them.

It is this frustration that contributes to the negative image of highway improvement companies and ODOT. A commitment by project managers to communicate how and when a project will affect the traveling public will do much toward neutralizing frustrations. Communication will help build a more positive image of the organizations and the people involved in building and maintaining Ohio's highways.

Overview

This manual was not intended to be a self-contained, "how-to-do-it" book on communication and public relations. Highway improvement project mangers are always encouraged to work with ODOT's public information personnel to develop an organized approach to the communication needs of any project.

Developing a communication plan for any given highway improvement project takes cooperation among the contractors, ODOT's project engineers, district public information professionals and Traffic Management Program (TMP) personnel (if applicable). If at all possible, the communication strategy should be finalized before the project begins. As part of the strategy, the responsibility for the research and implementation of the various communication elements needs to be determined. In special cases, a communication/public relations budget may need to be developed.

Appendix F
Project Communication Manual

It cannot be over emphasized that to have effective communication about a project, the parties involved must first communicate. It will be required that the contractor* project manager and ODOT's project engineer meet wit/' the ODOT district public information off cer to the start of any project either at the preconstruction meeting or a special meeting if a signifi cant amount of time lapses between the preconstruction meeting and the actual construction start date. If a TMP has assumed responsibility as a conveyor of information to the media and the motoring public, they should be involved in these meetings. The agenda of the meeting is to work out a communication program for the project and assignment of responsibilities.

ODOT has 12 districts and each has a public information officer who coordinates and directs the information flow to the public. Keeping the district public information officer informed in advance of project start dates, maintenance of traffic plans and completion dates has a number of advantages to those responsible for a project's progress. The public information office i equipped to handle the creation and dissemination of information. **Coordination with the public** information of fice gives project supervision one contact point simplifying the process. With advance planning and accurate, timely information, the driving public can choose alternate routes or allow extra time to travel through construction zones. This creates safer conditions within the construction zone.

A communication plan has to include all the stake holders who need to be "in the loop" and which communication tools should be used to target the stake holders. The communication plan and tools used can be either simple or complex. A news release announcing the start of the project and one at the completion of the project may be all that is necessary for a resurfacing project on a two-lane highway. A two-year rehabilitation of an interstate or lane addition along a commuter route in a metropolitan area, may require news releases and media alerts updating progress and special communications with businesses and residents along the construction zone. Examples of this extensive communication effort include using standards, such as news releases and business letters but adding other tools such as billboards, PSAs and project specific pamphlets. In some situations it may be recommended that a project communications liaison or coordinator be named to work with the ODOT public information office and/or the TMP.

An informed public is usually a more understanding and patient public. The responsibility to announce the start of the project and its progress may fall to ODOT's public information people, but the burden to provide accurate and timely information falls to the project's management starting with the contractor's project superintendent and ODOT's project engineer.

Appendix F
Project Communication Manual

There are a variety of communication tools available. Any highway improvement project could use many or all of them. It depends on the need and desire to communicate. It **also depends** upon identification of the stake holders. Defining the stake holders. selecting the tools, (SEE APPENDICES A & B) developing the message, and identifying areas of responsibility is the agenda of the suggested (and hardily encouraged) meetings with contractor and ODOT project management and public information employees.

On the following pages the manual divides construction projects into three different categories: *Major Impact, Medium Impact* and *No Impact*. Suggested charts to help in developing a communication plan for the specific type of highway improvement projects has been developed and are published in this manual (SEE APPENDICES C, D & E). The charts identify and reference the stake holders. and tools suggested being used for each type of project.

These charts are to be used as a guideline for all interested parties to ensure that the correct stake holders. and tools are utilized when a project begins, progresses and ends. Please note that the stake holders. or tools for any construction project may vary based on input from the contractor and ODOT.

Major Impact

Definition of major impact projects for purposes of this manual are any projects that:
affects the traveling lanes of interstate or multi-lane highways
have few or no alternate routes
closes a highway
is new highway improvement

By their very nature, major projects are more complex and involved often with **numerous phases of** construction. These phases affect the traffic maintenance plan, in turn, affecting the traveling public. Major projects usually extend over at least one construction season and often longer. This increases the driving public's exposure to the possible inconvenience of the highway improvement project adding to their frustrations. People living and working in and around the construction zone are affected to an even greater extent. They may individually travel the construction area daily, joining the more transient traffic experiencing lane shifts and delays. Customers and deliveries are delayed, also adding to construction project frustrations.

Appendix F
Project Communication Manual

Medium Impact Projects

For use in this manual Medium Impact Projects fall into the following categories:

two-lane resurfacing
·bridge repair with traffic maintained
·large guardrail replacement and installation
·pavement striping
·raised pavement marker installation

For the most part highway improvement projects of medium impact are shorter in duration when compared to the construction time lines of major projects. Lane closures are common and often temporary as the work zone moves.

The effects of such projects on the motoring public may **not be as great, but an agreeable** communication plan is highly advisable. Project management from the contractor and ODOT should meet or teleconference with ODOT's district public information people to work out the details at least two weeks before the project begins. Any project communication effort, minimally, should include a news release announcing the start of the project. There are exceptions, of course, requiring more extensive communication plans. A bridge repair with traffic maintained on a more rural highway will require less of a communication effort than the same type of project on a commuter route in an urban setting.

No Impact Projects

No impact projects do not affect traffic flow. They are normally within the highway right-of-way but not on the highway. The projects include:

· fence work
· mowing
· bridge painting not over traffic
· other projects not on or adjacent to the pavement

The only traffic implication is that motorists may inadvertently slow down in order to see what work is underway. There are situations where the work zone may be marked with signs, cones or barrels along the side of the road, raising some interest by motorists. Communication, in the form of a news release, should be done if only for informational purposes.

Communication Tools

News Releases are the workhorses of the communication tools. They are used to announce the start of all types of projects. Primary targets are the news media including both print and electronic media. Traffic reporters and transportation related Internet Web Sites should be included to report progress of major impact projects and some longer term medium impact projects. Copies of releases can be sent to other interested parties such as affected businesses, various state, local and county officials, just to name a few. Normally releases are produced by ODOT district public information personnel with information provided in a timely manner by specific project management. This tool may be partnered with a local TMP.

Media Alerts are the first cousins to the news release. The alert is briefer than the news release and can be effectively used to notify media about **upcoming events and project** progress such as lane shifts, temporary ramp closures, etc. Coordination of media alerts are through ODOT's district public information offices.. This tool may be partnered with a local TMP.

Business Letters are an easy way to communicate with specific stake holders. Letters can be mass-mailed, form letters or specifically addressed and customized. Letters can be used to notify legislators, local officials and affected businesses about highway projects in advance of the project's start date. This tool may be partnered with the prime contractor.

Newsletters are a versatile printed piece. The newsletter can carry a number of subjects using a modified newspaper layout including columns, headlines and possibly pictures and graphics. Newsletters are effective "handouts" for businesses and residences most affected by a project. This tool may be partnered with a local TMP.

Appendix F
Project Communication Manual

Diagrams and Maps are an efficient way for stake holders. to quickly visualize the project limits, detours and maintenance of traffic plans. Diagrams and maps can be easily included with news releases, media alerts, newsletters and project business letters. This tool may be partnered with a local TMP.

The above-mentioned mediums are relatively inexpensive to produce and are effective. They are considered standard issue for most project communication efforts. There are other communication tools that are worth consideration when developing a project communication plan. Many of them take time to develop and have certain costs associated with them. If a project communication plan is to incorporate any of the following items, a time line for development and production needs to be done and a budget allotted.

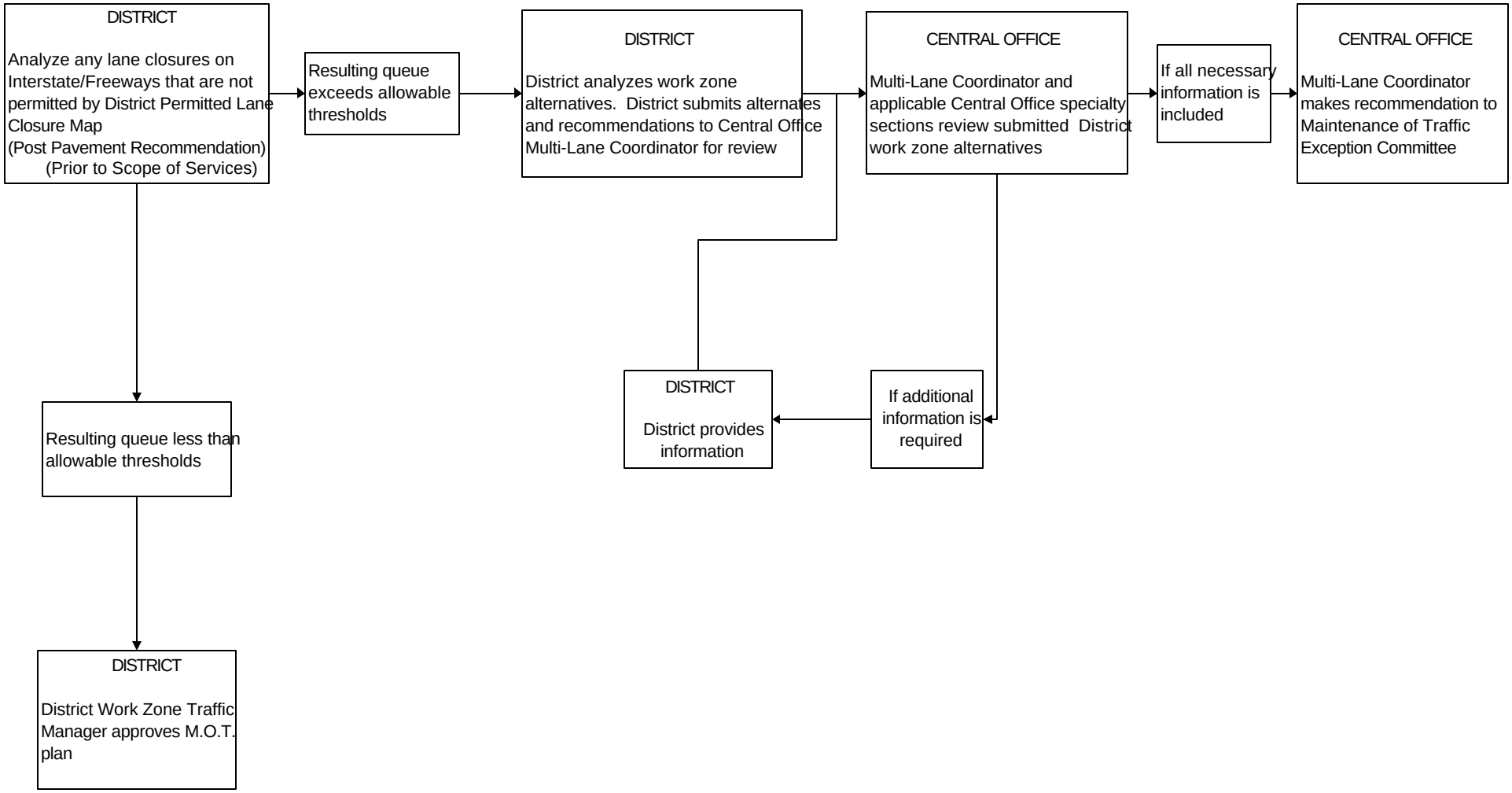
Posters can be used to announce the start of a project in advance of the start date and/or alternate routing. Posters can be provided to businesses within project limits to notify customers of construction. In certain situation posters can be placed in **rest areas near** the project. The design and printing of posters are often done by graphic design firms and commercial printers. This tool may be partnered with a local TMP.

Flyers and Pamphlets are used to describe a project **and its necessity and might include** maintenance of traffic plans and project diagrams. Distribution can be made through businesses adjacent to projects, travel organizations such as **automobile associations, rest** areas and Travel Information Centers to name a few. Although the design of a flyer or pamphlet may be provided by ODOT, often the printing is by commercial printer. This tool may be partnered with a local TMP.

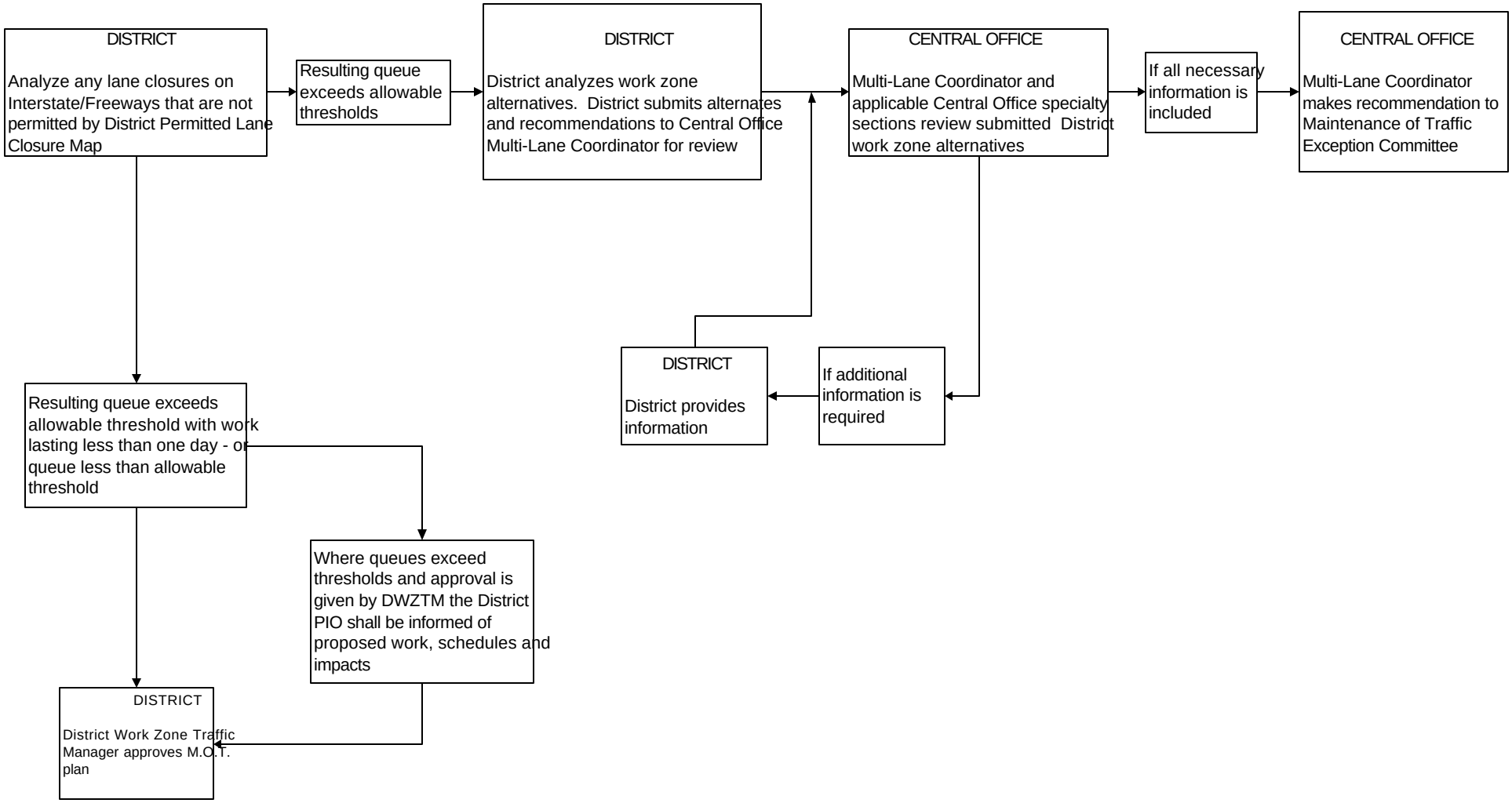
Billboards are used to announce the coming of a major project. **Placement is best on arterial** routes leading to the construction area. Billboards have limited usage since messages must be extremely brief and as time passes, motorists have a tendency to ignore them. Planning is necessary, because leasing billboards must be done in advance. Design of the **message,** printing it and posting on the billboard is done by commercial firms. This tool may be partnered with a local TMP.

Public Service Announcements can be used to support main messages of a project's communication plan. PSA's are useful for messages about safety in the work zone. Again, a time line needs to be established to allow for the scripting of the message, recording and distribution. There are agencies which will do PSA'S packages, but funding must be considered. This tool may be partnered with a local TMP.

CONTRACT WORK



MAINTENTANCE WORK



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Approved:

Effective: April 18, 1996
Responsible Office: Roadway Engineering
Policy No.: 519-002(P)

_____
Jerry Wray
Director

CURB RAMPS REQUIRED IN RESURFACING PLANS

PURPOSE:

The purpose of this policy statement is to establish that curb ramps are required as part of ODOT resurfacing plans.

AUTHORITY:

The need for curb ramps is established by the Federal Americans with Disabilities Act and an Ohio Attorney General's Opinion (September 27, 1995).

REFERENCES:

Section 306.4 of the ODOT Location and Design Manual.

42 U.S.C. 12132 (ADA)

42 U.S.C. 12131(1)

28 C.F.R. 35.151

SCOPE:

This policy is for the use of District Deputy Directors, Highway Managers, Planning and Programming Administrators, Production Administrators and other ODOT personnel with responsibilities for implementing pavement resurfacing plans.

BACKGROUND:

The Department has received an Attorney General's opinion based on a court case regarding the provision of curb ramps whenever a street or highway is resurfaced. As a result of this information, it is necessary to establish a policy for curb ramps on resurfacing projects. Previously, curb ramps were to be installed whenever curbs and walks were to be constructed, reconstructed or altered.

The Federal Americans with Disabilities Act (ADA) requires that public entities, when newly constructing or altering streets, roads and highways, must provide curb ramps at intersections with curbs or other barriers to entry from street level pedestrian walkways. The court decision establishes that resurfacing a street or highway is to be construed as altering the facility; therefore, curb ramps must be provided as part of the resurfacing if none are present.

DEFINITIONS:

Americans with Disabilities Act (ADA): A Federal law which prohibits discrimination by a public entity against a disabled individual as to benefits or programs of said public entity.

POLICY:

I. It is the policy of the Ohio Department of Transportation to construct curb ramps at intersections located within the resurfacing limits of all resurfacing projects (regardless of urban or rural location) whenever both curbs and sidewalks are present and curb ramps do not exist.

   A. In most cases, curb ramps will be installed in all quadrants of an intersection.

   B. This policy statement includes building curb ramps on the side street, too, even if no resurfacing occurs there and in a quadrant where only a curb is present and no sidewalk exists as long as the opposite side of the street has both curbs and sidewalks.

II. The ramps shall be constructed according to Section 306.4 of the ODOT Location and Design Manual.

III. The curb ramps installed in resurfacing projects shall be funded using project funds, regardless of project funding and urban or rural location. Project funding from District allocations shall be used unless the funding for the project is one of the four categories controlled by Central Office (Major New, Major Bridge, Safety and Transportation Enhancements) or unless the project is an LPA project. In such a case, the curb ramps shall be at project funding from the appropriate Central Office account.

IV. This policy is effective upon approval of the Executive Management Committee.

   A. All tracings for resurfacing projects filed in Central Office on or after the effective date on page one shall include provisions for curb ramps in accordance with this policy.

B. Curb ramp details are shown on Standard Construction Drawing BP-7.1 and the metric equivalent.

V. For the following categories of resurfacing projects (in existence prior to the effective date on page one) which have both curbs and sidewalks at intersections within the resurfacing limits, curb ramps shall be added to the project by change order/extra work contract at project expense to conform to the policy statement:

A. projects already under construction and for which the Contractor has not demobilized and which have both curbs and sidewalks at intersections within the resurfacing limits

B. projects awarded to the Contractor and work has not yet started

C. projects for which tracings have been filed in Central Office but bids have net been received

VI. Determination of cost for adding curb ramps by extra work contract shall be performed at the District level; however, the Office of Estimating in the Central Office may be consulted for assistance.

VII. Legislation requiring the appropriate agency to maintain the curb ramps installed by extra work contract shall be obtained by the District. After installation, the curb ramps shall be maintained by the same agency (City, Village, County, Township or ODOT) that maintains the adjacent sidewalks. When obtaining legislation for the resurfacing project, the issue of maintenance of curb ramps shall be addressed.

TRAINING:

None required.

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ODOT Standard
December 20, 1999

Supercedes Standard Operating Procedure PH-P-301
Dated March 27, 1991

To: **Assistant Directors, Director's Office Staff, Deputy Directors, District Deputy Directors, and Office Administrators**

Subject: **Procedures for Processing Revisions to Highway Functional Classification, Federal-aid Systems, and Urban/Urbanized Area Boundaries**

A. Purpose

This Standard Operating Procedure sets forth procedures for use by State and local agencies in processing proposed revisions to highway functional classification and federal-aid systems and in re-designating urban/urbanized area boundaries following the decennial U.S. Census.

B. Authority

1. Functional Classification and Federal-aid Systems

a. Proposed revisions to the functional classification and federal-aid systems shall conform to all applicable federal and state laws, regulations, and guidance including the following: **23 USC 103, 23 USC 139, 23 USC 134** and **135, 23 USC 101(a), ISTEA Section 1105(c), NHS Act Section 332, 23 CFR 470, Highway Functional Classification --- Concepts, Criteria and Procedures** (revised March 1989) and the **Federal-Aid Policy Guide (FAPG), Chapter 4 [G 4063.0],** dated December 9, 1991.

2. Urban/Urbanized Area Boundaries

a. Authority to establish urban/urbanized boundaries is set forth in **Section 101(A)** of **Title 23 U.S.C.** and guidance is provided in **23 CFR 470** and in **Federal-Aid Policy Guide, Chapter 4 [G 4063.0],** dated December 9, 1991. State and Local Officials responsible for this process should follow these guidelines.

C. Background

1. Federal Statutes, Regulations, and Guidance

a. The **Federal-Aid Highway Act of 1973** substantially amended **23 USC 103** (Federal-Aid Systems) and established the policy and procedural direction for making amendments, modifications, and revisions to the Federal-aid systems. Despite legislative changes to the Federal-aid systems in 1991, the direction resulting from the 1973 Act has remained largely intact and has been woven into the current Federal regulation and guidance documents described below.

b. **The Intermodal Surface Transportation Efficiency Act (ISTEA)** of 1991 represents the first Federal statute to substantially amend **23 USC 103** (Federal-aid systems) since the Federal-Aid Highway Act of 1973. **ISTEA** amended **23 USC 103** by:

(1). Repealing the Federal-aid primary, secondary, and urban systems (**Section 1006(c)**);

(2). Establishing the Federal-aid systems as the Interstate System and the National Highway System. This included defining the NHS components, mileage requirements, eligibility, transferability, etc. The NHS includes all high priority corridors in **Section 1105(c)** of **ISTEA**;

(3) Requiring all states to functionally reclassify their roads and streets;

(4). Redefining Federal-aid highways as "other than highways classified as local roads or rural minor collectors" (**23 USC 101(a)**). (See Section C.1. c. below);

(5). Retaining previous statutory provisions such as highway/transit flexibility, MPO consistency (**23 USC 134**), state highway agency responsibility (in cooperation with local officials).

c. Section **23 USC 133 (d) (3)** provides for the suballocation of Surface Transportation Program (STP) to areas less than 5000 population. Of this amount sub-allocated to rural areas, **Section 1108 (f)** of the **Transportation Equity Act for the 21st Century (TEA-21)** permits spending "up to 15%" (of this reserved amount) on rural minor collectors.

d. The policies and procedures set forth in the Federal regulation **23 CFR 470**

(Highway Systems) should be used for identification of Federal-aid highways and the designation of routes on the Federal-aid highway systems. This regulation should be referred to for general policy for the functional classification of roads and streets and the designation of urban area boundaries.

e. For highway functional classification, guidance criteria and procedures are provided in the FHWA publication **Highway Functional Classification - Concepts, Criteria and Procedures** (revised March 1989).

2. Ohio System Revisions and Updates

a. Ohio's Functional Classification system is reviewed after each decennial U.S. Census. ODOT and local jurisdictions cooperate in designating new urban and urbanized area boundaries based on the census boundaries established by the U.S. Census Bureau. These adjustments result in the transfer of some mileage and routes between the rural and urban systems and require a change in the route's functional classification. During the decennial update, all rural and urban classifications may also be reviewed to consider the impacts of development and land use changes on adjacent routes.

b. ODOT may also undertake special functional classification studies from time to time to meet particular transportation planning needs or in response to mandates from the Federal Highway Administration.

c. ODOT also revises the functional classification system as needed to respond to changes in the highway network. Requests for changes to the rural and urban functional classification systems may be submitted by local jurisdictions (referenced in Section D) at any time. Changes in traffic volumes and travel patterns affect the way particular roads function and the level and type of service they provide. Construction of new roads and realignments and relocations of existing roads require updating of classifications. ODOT reviews every request to ensure the route complies with federal functional classification concepts, criteria, and procedures.

3. Uses of Functional Classification

a. Functional classification is used to identify roads, streets, and highways that are eligible for federal funds. To qualify for federal funds, a facility must be classified higher than a Local on the urban and rural systems.

b. Functional classification is used as a management tool in transportation planning. ODOT uses functional classification as one measure of a route's transportation

importance and efficiency in project selection and program management. ODOT also uses functional classification to determine maintenance allocations and data collection needs, and to set design criteria for various roadway features such as lane and shoulder widths, horizontal and vertical clearances, and design speeds.

D. Responsibility for Initiating and Processing System Revisions

1. Metropolitan Planning Organizations

a. Metropolitan Planning Organizations (MPOs) shall have the responsibility for initiating requests for revisions to the functional classification and federal-aid systems located within the designated urbanized area boundary of the MPO. Requests for system revisions from local jurisdictions within the designated urbanized area boundary shall be submitted to the appropriate MPO for consideration.

b. The MPO shall review all requests for revisions from local jurisdictions within the MPO's designated urbanized area boundary for compliance with functional classification criteria.

c. The MPO shall forward requests for system revisions within the designated urbanized area boundary, along with the MPO's recommendation for approval or disapproval of the request, to the appropriate ODOT District Office for State review and processing.

2. Counties and Small Urban Areas

a. Counties and small Urban Areas shall be responsible for initiating system revisions on non-State highways and streets located outside of an MPO's designated urbanized area boundary. (Small Urban Areas are defined as those urban places identified by the U.S. Bureau of the Census as having a population of 5,000 or more.)

b. Counties and small Urban Areas located outside of an MPO's designated urbanized area boundary but within the MPO's planning jurisdiction should coordinate proposed system revisions with the MPO.

c. All other counties and small Urban Areas shall forward requests for systems revisions to the appropriate ODOT District for review and further processing.

3. ODOT Districts

a. ODOT Districts shall be responsible for submitting system revisions for all State

highways in all areas outside the designated urbanized area boundaries of MPOs. ODOT Districts should coordinate proposed system revisions for areas within the planning jurisdiction of an MPO.

b. ODOT Districts shall review all requests submitted by local agencies and MPOs for completeness of format, and content and for compliance with the concepts, criteria, definitions, and procedures for developing functional classifications.

c. ODOT Districts shall forward requests for system revisions to the Office of Urban and Corridor Planning for further processing. It is desirable, but not mandatory, that ODOT Districts make a recommendation for approving or disapproving requests before forwarding them to the Office of Urban and Corridor Planning.

d. ODOT Districts shall be responsible for notifying local jurisdictions of the result of any action taken by the Functional Classification Committee and/or FHWA concerning local submissions and for distributing copies of new Functional Classification Inventory records and systems maps to appropriate local jurisdictions.

4. ODOT Office of Urban and Corridor Planning

a. All proposed system changes shall be forwarded to the Office of Urban and Corridor Planning for State review and processing. The Office of Urban and Corridor Planning shall ensure that all submissions are complete and include all material such as maps, Functional Classification Revision forms, a statement of justification, approval letters or recommendations, and any other material necessary to act upon the submission. The Office of Urban and Corridor Planning, shall notify the appropriate ODOT District Office if a submission is incomplete and lacking sufficient information.

b. The Office of Urban and Corridor Planning shall prepare all submissions for consideration and review by the ODOT Functional Classification Committee.

c. If the Functional Classification Committee disapproves a request for a system change, the Office of Urban and Corridor Planning shall notify the appropriate ODOT District of the reasons for the disapproval.

d. If the Functional Classification Committee approves a request for a system change, the Office of Urban and Corridor Planning shall prepare a transmittal letter and necessary information for submission to the Federal Highway Administration (Ohio Division) for their review and approval. Transmittal of a request to FHWA shall constitute Departmental approval. The submission to FHWA shall include at least the following items:

(1) Map(s) showing the existing and proposed systems;
(2) Functional Classification Revision form(s) describing the proposed route change and the revised system mileage;
(3) A statement that the proposed change complies with applicable concepts, criteria, definitions, and procedures;
(4) A statement of the revised functional percentages for the classification and area resulting from the proposed change;
(5) Supporting letters or resolutions, if necessary, as evidence of local coordination and participation.

e. Upon receipt of FHWA approval or disapproval of a requested change, the Office of Urban and Corridor Planning shall notify the appropriate ODOT District who shall, in turn, notify the local jurisdiction of the decision.

f. The Office of Urban and Corridor Planning shall maintain the Functional Classification Inventory of all approved functional classifications above a Rural or Urban Local. The Inventory shall include, at a minimum, the county, route number, functional classification, section length, and description of the physical termini of each route so classified, and shall conform to the Base Highway Referencing System (BHRS) as developed.

g. The Office of Urban and Corridor Planning shall notify appropriate ODOT offices of any approved system changes and of the availability of the Inventory.

h. The Office of Urban and Corridor Planning shall be responsible for providing the Federal Highway Administration with maps of the functional classification and/or federal-aid systems as required.

5. Functional Classification Committee

a. The Functional Classification Committee shall coordinate all Department activities as set forth in the **Procedures for Processing Revisions to Highway Functional Classification, Federal-aid Systems, and Urban/Urbanized Area Boundaries** for the designation, revision, inventory, and maintenance of the highway functional classification and federal-aid systems and shall be responsible for Departmental approval or disapproval of all requests for changes to functional classification systems and urban/urbanized boundaries in accordance with all applicable regulations and requirements.

b. The Functional Classification Committee shall conduct any special functional classification studies as may be required in response to federal mandates or to meet

particular transportation planning and management needs of the Department.

c. The Functional Classification Committee shall be responsible for coordinating with officials of adjacent states in the designation of systems which cross the states' common borders.

d. The Functional Classification Committee shall be composed of one representative from the following offices: Office of Technical Services, Office of Project Coordination, and FHWA, and two representatives from the Office of Urban and Corridor Planning.

6. Office of Technical Services

a. The Office of Technical Services shall revise all functional classification and federal-aid system maps and shall distribute the revised and corrected maps to ODOT Districts and other appropriate offices.

b. Road and street mileage inventory records maintained by the Office of Technical Services shall be updated to reflect system revisions relative to the following items: (1) functional classification code; (2) federal-aid system code; and (3) geographic area code.

E. Submission Requirements for Functional Classification Changes

1. Statement of Justification

a. All requests for system revisions must include a written justification for the change. Supporting material should include but is not limited to evidence of a change in actual function of a road or street within the system. A change in function generally results from altered travel and/or traffic patterns caused by a change in adjacent land use, or development of new traffic generators, or changes to the road system caused by new facilities, relocations, and/or realignments. Changes in travel and/or traffic patterns are indicated by increases or decreases in traffic volumes or in the type and mix of vehicles using a facility.

b. Requests for system revisions based on planned or proposed development must include evidence of a commitment that the anticipated development will, in fact, be realized within a reasonable time period, generally six years. **Changes in functional classification will not be considered simply to obtain federal funding eligibility for proposed projects or improvements.**

c. The requirement for a written justification of a functional change may be waived

during the decennial update.

2. Functional Classification Revision Form

a. A Functional Classification Revision Form must be completed for all requested changes to the rural and urban systems. A copy of the form is attached.

b. Rural and urban revisions are to be recorded separately and are not to be combined on the same form. Rural changes must be grouped by county. Standard ODOT abbreviations may be used for counties. Urban changes must be grouped by urban/urbanized area.

c. The state, county, or township route numbers and, when applicable, the municipal street name must be entered for the section being described.

d. The description of the route termini must be specific and **identify the beginning and ending points for the section being described.** Road Inventory practice must be followed by describing the direction of the route proceeding either from south to north or west to east. (Example: "From SR 1 (Oak St) north to Elm St." For State routes, the termini description shall include the beginning and ending log points. In the case of multiple maps for an urbanized area, appropriate map numbers shall be included for reference as part of the route description.

e. The route's existing and proposed functional classifications must be entered. Standard federal codes or text abbreviations as shown below must be used.

Rural Classifications

01 or R IR = Interstate
02 or R Prin Art = Other Principal Arterial
06 or R Min Art = Minor Arterial
07 or Maj Coll = Major Collector
08 or Min Coll = Minor Collector
09 or R Loc = Local

Urban Classifications

11 or U IR = Interstate
12 or Fwy/Xpwy = Freeway/Expressway
14 or U Prin Art = Other Principal Arterial

16 or U Min Art = Minor Arterial
17 or U Coll = Collector
19 or U Loc = Local

f. Mileage for each route change, whether an addition (Add) or subtraction (Sub) to the system must be entered and totaled. Mileage data should be consistent with the latest Road Inventory files.

3. System Maps

a. All requests for system revisions shall include a map(s) showing existing systems and proposed changes. Approved functional classification maps are preferred over locally produced maps.

b. Map scale and coverage should be sufficient to show the impact and relationship of the proposed change to the area's system.

4. Approval Letters and Recommendations

a. Letters of approval or recommendations are required for all revisions to functional classification, federal-aid systems, and urban/urbanized area boundaries.

b. For revisions to rural and urban functional and/or federal-aid systems located within an MPO's jurisdiction, a letter recommending approval or disapproval from the MPO shall be submitted with evidence of local cooperation and coordination. This will suffice for all local governmental bodies including counties, townships, and municipalities within the MPO's jurisdiction.

c. For revisions to systems located outside an MPO's jurisdiction, letters recommending approval or disapproval from principal elected officials of general purpose local governments are required. In Ohio, the term "Principal Elected Officials" has been interpreted as being the County Commissioners and/or County Engineer for county and township roads and the Mayor and/or City Council for municipal streets.

d. Transmittal letters should include the following items:

(1) a description of the proposed revision;
(2) a recommendation concerning the proposal;
(3) a statement requesting the Department to review the proposal;
(4) signature of appropriate official(s)

F. Urban/Urbanized Boundaries

1. U.S. Decennial Census.

a. Following each decennial census, or as soon thereafter as practical, ODOT in cooperation with appropriate local officials shall undertake a review and update of the urban and urbanized area boundaries of the state. "Appropriate Local officials" means (1) in urbanized areas, the principal elected officials of general purpose governments acting through the Metropolitan Planning Organization, or (2) in rural and urban areas not within any urbanized area, the principal elected officials of general purpose local governments, i.e. the County Commissioners and/or County Engineer for county and township and the Mayor and/or City Council for municipalities.

2. Criteria for Establishing and Revising Urban and Urbanized Area Boundaries

a. The following criteria are provided as guidelines for the establishment, submission, and approval of urban and urbanized area boundaries.

b. Urban/urbanized area boundaries shall, as a minimum, encompass the entire urban place or urbanized area as designated by the U.S. Bureau of Census and have a population of 5,000 or more. The boundaries shall consist of a continuous line encompassing the entire urban area. There shall be no detached portions of any urban area.

c. The urban/urbanized area boundary designated by State and Local officials must be equal to or greater than the boundary designated by the U.S. Census Bureau. The urban/urbanized area boundary may be expanded beyond the Census boundary to smooth out irregularities, maintain administrative continuity of peripheral routes, and encompass fringe areas having residential, commercial, industrial, and/or national defense significance. Transportation terminals serving the area, such as airports and seaports, should also be included within the redefined area if they lie within a "reasonable" distance of the urban area boundary that would otherwise be selected.

d. State and Local officials should carefully consider the selection of boundary locations which include logical control points for transportation linkages such as interchanges and major cross roads, where the inclusion of such areas will not unduly distort the urban area as would otherwise be selected. Boundaries should be so delineated that they can be easily located in the field from data shown on maps or aerial photography. It is desirable that the boundaries follow physical features such as streams, railroads, or streets.

e. Where an urban/urbanized boundary coincides with or closely follows a road or street, the boundary shall be so designated either to include or exclude the entire street or highway. The boundary shall not split a road or street.

f. Census boundaries should not be modified to accommodate a single project.

g. When the Urban/Urbanized area boundaries are being extended to encompass **residential development** only, a minimum of 1,000 population per square mile will be necessary for inclusion within the designated area.

h. Urban/urbanized boundaries should consider the service areas of transit operations.

i. Urban/urbanized area boundaries are fixed primarily to determine capital funding and are not to be confused with boundaries established for the comprehensive, cooperative, and continuing urban transportation planning process.

j. Where an urban/urbanized area extends into an adjoining state, the contiguous states are encouraged to agree on the proposed boundary locations at the state line and avoid irregularities.

k. If the revised urban/urbanized area boundary is established inside the previous FHWA approved urban/urbanized boundary, funding for currently programmed projects may be affected.

_____

Assistant Director, Planning and Production Management

Attachment Functional Classification Revision Form
Instructions for Completing the Revision Form

Ohio Functional Classification Revision Form

Prepared by **Sheet** **of**

District	County	Urban/Urbanized Area

Route Designation			Description of Route Termini (Include beginning and ending log points for all state routes).	Functional Classification			
SR	CR/TR	Street Name		Existing	Proposed	Mileage	
						Add	Sub
					Totals		

Rev 8/98

Instructions for Completing the Functional Classification Revision Form

1. A Functional Classification Form must be completed to describe all requested changes to the rural and urban functional classification systems.

2. Do not intermix rural and urban changes on the same sheet. Group rural changes by county, and indicate the number of sheets for each county's listing. Use ODOT standard abbreviations for counties. Similarly, group all urban changes by urban/urbanized area and indicate the number of sheets for each area.

3. Record the state, county, or township route numbers and, when applicable, the municipal street name.

4. Describe the route and its termini. Follow Road Inventory practice and describe the route proceeding either from south to north or west to east. Example: "From SR 1 (Oak St) north to Elm St." For State routes, include beginning and ending log points to help locate the termini of the route's description.

5. Record the Existing and Proposed functional classifications. Use standard federal codes or text abbreviations shown below.

Rural	**Urban**
01 or R IR = Interstate	**11 or U IR = Interstate**
02 or R Prin Art = Other Principal Arterial	**12 or Fwy/Xpwy = Freeway/Expressway**
06 or R Min Art = Minor Arterial	**14 or U Prin Art = Other Principal Arterial**
07 or Maj Coll = Major Collector	**16 or U Min Art = Minor Arterial**
08 or Min Coll = Minor Collector	**17 or U Coll = Collector**
09 or R Loc = Local	**19 or U Loc = Local**

6. Enter the mileage for each route change, whether an addition or subtraction to the system. Total the mileage for each sheet.

7. Justification

Requests for functional revisions must include a written justification, usually included in the transmittal letter.* Justification may include but is not limited to evidence of an actual change in the street or highway's function. A change in function generally results from altered travel and/or traffic patterns caused by changes in adjacent land use, development of new traffic generators in the area, or changes to the road system such as new facilities. Changes in travel and/or traffic patterns are indicated by increases or decreases in volumes or in the type and mix of vehicles using the facility. Requests for revisions based on planned or proposed development must include evidence of a commitment that the development will, in fact, be realized within a reasonable time frame, generally six years. Changes in functional classification **will not be considered** simply to obtain funding eligibility for proposed projects or improvements.

(* The requirement for a justification of a functional change may be waived during the decennial update.)

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Approved:

Standard Procedure: 510-005(SP)
Effective: August 1, 2001
Responsible Office: Division of Construction Management

Walid Gemayel, Deputy Director
Division of Construction Management

CONSTRUCTION AND MATERIALS SPECIFICATION DEVELOPMENT

STANDARD PROCEDURES

PURPOSE

These standard procedures are for the development and implementation of new or modified Specification and related pay items. They include handling, processing, reviewing, obtaining FHWA approval, distribution and implementation.

DEFINITIONS AND ABBREVIATIONS

Specifications: Contract documents used to issue instructions to contractors. For the purposes of this procedure, Specifications will include: the C&MS, Supplemental Specifications, Supplements, Special Provision Specifications, Proposal Notes, and Plan Notes.

Specification Committees: Specification committees are working committees, formed around specific materials or construction tasks, and composed of ODOT district and central office staff, representatives from the Federal Highway Administration and industry trade groups

Construction and Material Specifications Book (C&MS): The C&MS contains detailed provisions, which, together with the Plans and the Proposal, constitute the Contract for the performance of required work. It is the official legal and technical document by which the Department bids and constructs highway projects.

Supplemental Specifications: Individual numbered documents prepared in loose-leaf form describing the construction and material specifications for new items.

Special Provision Specifications: Individual numbered specifications prepared in loose-leaf form

describing the construction and material specifications for items whose requirements are not covered in the C&MS or in Supplemental Specifications.

Supplements: Supplements provide necessary information such as laboratory methods of test, and certification or pre-qualification procedures for materials.

Proposal Notes: Proposal notes contain a wide variety of legal and technical requirements necessary for the proper bidding and sale of an individual project. Those notes override all other requirements in the Plan, C&MS, Supplemental Specifications, and Standard Construction Drawings.

Plan Notes: A plan note describing a non-standard pay item that deviates from the C&MS, supplemental specification or Standard Construction Drawing.

New Products: Materials, equipment and processes, unspecified and previously unused by the Department, which are being proposed for use in the construction, maintenance, or operation of transportation facilities. Also referred to as experimental materials, or new materials.

PROCEDURE STATEMENT

I. Specification Committees

A. Pavement Material and Construction Committee

B. Structures Committee

C. Earthwork and Hydraulics Committee

D. Contract Administration Committee

E. Traffic and Miscellaneous Items Committee

II. Specification Committee Chairperson - The Deputy Director of the Division of Construction Management shall assign a chairperson to each Specification committee.

The chairperson shall:

A. Act as the liaison between the department and the industry;

B. Determine the merit of all initial Specification submittals;

C. Initiate committee meetings;

D. Distribute meeting notices and agendas to committee members to allow sufficient time for review prior to meetings;

E. Review final Specification draft for approval by the executive committee.

III. Initiation

A. General: All initial Specification submissions must be submitted in writing to the appropriate Specification committee chairperson. Contractors, producers, suppliers and consultants must submit their requests through their association. FHWA may submit their request directly to the appropriate committee chairperson. Department staff must submit their request through their administrator.

B. C&MS and Supplemental Specifications: All initial submissions for proposed C&MS and Supplemental Specifications must cover or reference the following topics:

1. Description

2. Materials

3. Construction requirements

4. Method of measurements

5. Basis of payment

6. Designer note to address conditions under which the Specification will be used on construction projects

IV. Specification Committees' tasks

A. General:

1. Review and update existing Specifications as needed;

2. Review proposed Specifications;

3. Write all proposed Specifications in the active voice, imperative mood style with a designer note;

4. Circulate proposed draft Specifications for review by additional department and industry members as needed;

5. Keep detailed minutes of committee meetings;

6. Provide all documentation needed for the distribution of new and revised Specifications;

7. Review new products.

B. C&MS: Ensure that Specifications are not placed in the C&MS until construction and material requirements have been proven to work and accepted as an industry practice.

C. Supplemental Specifications:

1. Review existing Supplemental Specifications and recommend incorporating in C&MS or as Special Provision Specifications.

2. Implement new Specifications whose requirements may change from year to year and are still in the developmental or experimental stage as Supplemental Specifications.

3. Assign a limited lifetime to Supplemental Specifications, normally no more than four years.

4. Ensure that Supplemental Specifications will be incorporated in the C&MS, discontinued, or become a Special Provision Specification within four years.

D. Special Provision Specifications:

1. Review and update existing Special Provision Specifications as needed.

2. Ensure that Special Provision Specifications are applied on specific projects.

E. Supplements: Review and update existing Supplements as needed.

F. Proposal and Plan Notes:

1. Review and approve modifications to standard Proposal and Plan Notes

2. Review and approve new Proposal and Plan Notes.

3. Ensure that the main usage for Proposal and Plan Notes is to:

a. Correct errors or make minor changes to existing Specification items of plan drawings.

b. Add specific language directing the Contractor.

G. New Products:

1. Review and evaluate all new products, if the new material or technique appears to offer potential benefits, the Committee Chairperson will arrange a presentation and / or demonstration.

2. Review and authorize experimental project work plans to test products as required.

a. The Committee Chairperson will review the comments and other information as necessary to determine whether the material or technique merits further consideration by the Committee.

b. If the decision is negative, the initiating party will be so advised by the Committee Chairperson.

c. If the decision is positive, appropriate personnel will be contacted by the Committee Chairperson to set up an evaluation or initiate implementation via changes in Specifications.

(1) A coordinator assigned to conduct the evaluation will prepare a work plan for review and approval by the Committee Chairperson. See Experimental Product / Technique Evaluation Work Plan in Appendix C.

(2) During the evaluation process, the coordinator will provide periodic reports of performance until the conclusion of the evaluation period. The coordinator at the conclusion of each evaluation will prepare a final report. Evaluations may be terminated at any time if performance does not meet expectations.

V. Executive Committee

The executive committee is responsible for final approval of all Specification on behalf of the department. Members of the executive committees are:

A. Assistant Director for Highway Management,

B. Deputy Director Division of Construction Management,

C. Deputy Director Division of Contract Administration,

D. Deputy Director Division of Highway Operations and

E. Deputy Director Division of Production.

VI. Specification Coordinator duties

A. Logging and dating final draft Specifications submitted by the Specification committees;

B. Ensuring Specification writing style consistency;

C. Maintaining a computer record of all Specifications status;

D. Forwarding the final draft Specification from the committees to the Executive Committee within 5 working days;

E. Logging, dating and forwarding all approved Specifications from the executive committee to FHWA within 5 working days;

F. Returning non-approved Specifications to the originating Specification Committee with comments.

G. Publication of the Specification, its designer note and other written guidance, after FHWA approval;

H. Distribution of paper copies to the ODOT list;

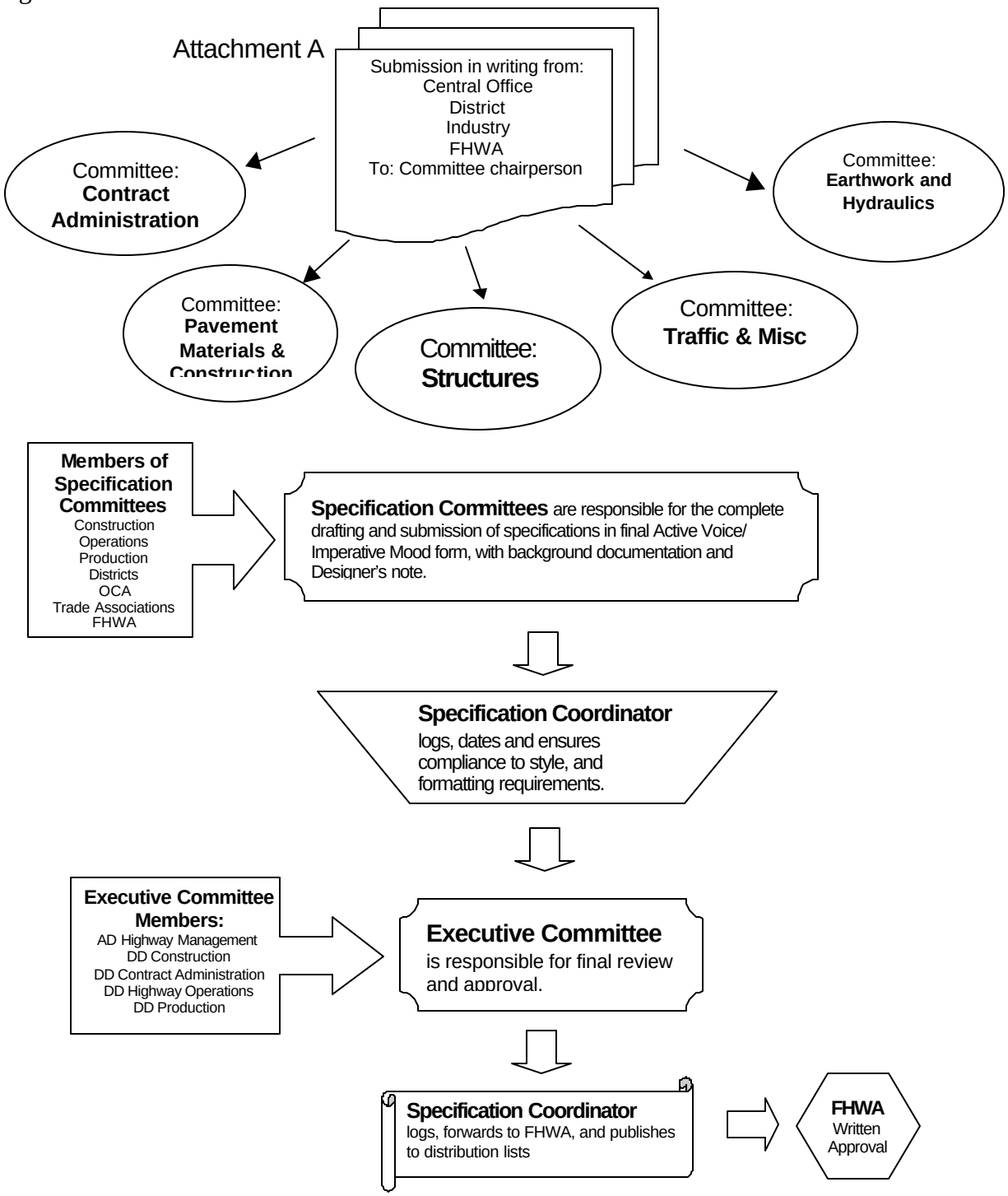
I. Publication of Specification, its designer note and other written guidance, on the Internet under the appropriate Specification section;

J. Sending notification to all Specification users along with the designer notes, and other written guidance.

VII. Training

Specification Committee chairs must complete a course on writing Specifications in the Active Voice/Imperative Mood style.

Attachment A



Attachment B

MEMBERSHIP OF SPECIFICATION COMMITTEES

PAVEMENT MATERIALS & CONSTRUCTION COMMITTEE	
Chairperson: Administrator, Office of Materials Management	
Concrete sub-committee: Specification Sections: 255, 256, 305, 450, 608, 609, 611, 612, 622 and pertinent 700 sections	**Asphalt** sub-committee: Specification Sections: 251, 252, 253, 254, 301, 302, 307, 400, 615, 618, and pertinent 700 sections
Construction Office	Construction Office
Materials Management Office	Materials Management Office
Pavement Office	Pavement Office
Division of Production	Division of Production
Estimating Office	Estimating Office
Geotechnical Engineering Office	Geotechnical Engineering Office
Roadway Engineering Services Office	Roadway Engineering Services Office
District Office Representative	District Office Representative
Federal Highway Administration	Federal Highway Administration
Ohio Contractors Association	Ohio Contractors Association
Contractor (chosen by Ohio Contractors Association)	Contractor (chosen by Ohio Contractors Association)
Consulting Engineers Council of Ohio	Consulting Engineers Council of Ohio
American Concrete Pavement Association	Flexible Pavements of Ohio
Ohio Aggregates & Industrial Minerals Association	Ohio Aggregates & Industrial Minerals Association
Ohio Ready Mix Concrete Association	

STRUCTURES COMMITTEE	
Specification Sections: 500, 610, and pertinent 700 sections	
Construction Office, **Chairperson**	
Materials Management Office	
Structures Office	
Division of Production	
Estimating Office	
Geotechnical Engineering Office	
Roadway Engineering Services Office	
District Office Representative	
Federal Highway Administration	
Ohio Contractors Association	
Contractor (chosen by Ohio Contractors Association)	
Ohio Ready Mix Concrete Association	
Consulting Engineers Council of Ohio	

Attachment B - continued

EARTHWORK AND HYDRAULICS COMMITTEE	
Specification Sections: 201-209, 304-307, 410, 411, 601-605, 613, 616, 617, 638, 651-673 and pertinent 700 sections.	
Geotechnical Engineering Office, **Chairperson**	
Materials Management Office	
Structures Office	
Construction Office	
Pavement Office	
Division of Production	
Estimating Office	
Office of Environmental Services	
Roadway Engineering Services Office	
District Office Representative	
Federal Highway Administration	
Ohio Contractors Association	
Contractor (chosen by Ohio Contractors Association)	
Consulting Engineers Council of Ohio	
Ohio Aggregates & Industrial Minerals Association	

CONTRACT ADMINISTRATION COMMITTEE	
Specification Sections: 100	
Construction Office, **Chairperson**	
Division of Contract Administration	
Materials Management Office	
Division of Highway Operation	
Division of Production	
District Office Representative	
Federal Highway Administration	
Ohio Contractors Association	
Contractor (chosen by Ohio Contractors Association)	
Consulting Engineers Council of Ohio	

TRAFFIC AND MISCELLANEOUS ITEMS	
Specification Sections: 606, 607, 614, 617, 619 – 633, 640, 651 to 673, and pertinent 700 sections.	
Traffic Office, **Chairperson**	
Materials Management Office	
Construction Office	
Pavement Office	
Division of Production	
Estimating Office	
Roadway Engineering Services Office	
District Office Representative	
Federal Highway Administration	
Ohio Contractors Association	
Contractor (chosen by Ohio Contractors Association)	
ITE (Institute of Traffic Engineers)	
Consulting Engineers Council of Ohio	

The Specification Committee Chairpersons will coordinate to ensure all Specification Sections are properly assigned.

Attachment C

OHIO DEPARTMENT OF TRANSPORTATION

EXPERIMENTAL PRODUCT / TECHNIQUE EVALUATION WORK PLAN

Experimental feature to be evaluated:_____
Manufacturer: _____
Proposed location:_____ PID or Project No:_____
Anticipated installation date: _____ Estimated Feature Cost: _____
Person responsible for evaluating the experimental feature and preparing the required reports:_____
Is federal oversight required?_____

To what extent has this feature been used in Ohio? Elsewhere?

What potential benefits can be derived from the installation of this experimental feature?

How will the experimental feature be installed?

How will performance be evaluated? Will there be a standard or control against which performance can be judged?

Prepared by: _____ Approved/Date: _____
Office or District: _____ _____
Date: _____ (Specification Committee Chairperson)

Additional comments may be put on the back of this sheet.