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TRAFFIC SIGNAL HANDBOOK

This Handbook Supplements

Section 711 of Department of Transportation REGULATIONS

Governing The Design, Location And Operation
Of All Official Traffic Signs, Signals And
Markings On And Along Highways Within
The Commonwealth of Pennsylvania

Prepared By

Pennsylvania Department of Transportation
Bureau of Traffic Engineering
Harrisburg, Pennsylvania

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TRAFFIC SIGNAL HANDBOOK

1.0 GENERAL

This Handbook is to be used as a further guide on matters pertaining to Traffic Signal installation. As such, it will supplement the Regulations of the Commonwealth dated December 1, 1967 and Amendments thereto.

1.1 TRAFFIC SIGNALS

Traffic signal shall operate continuously as "Stop and Go" or Flashing".

When used as a flashing signal (during emergencies or periods of low traffic flow), it shall flash red on the minor street(s) and yellow on the major street(s).

1.2 FLASHING BEACON

A Flashing Beacon is a section of a traffic signal head or a similar type device having a yellow or red lens. When used, the red shall flash 24 hours per day while the yellow may flash all day or during those hours when the hazard or need for caution exists.

The operation and meaning of Flashing Signals and Flashing Beacons are similar in that the illuminating element shall be flashed continuously at a rate not less than 50 nor more than 60 pulsations per minute. The illuminated period of each flash shall not be less than half and not more than two-thirds of the total flash cycle.

1.3 PEDESTRIAN SIGNALS

Pedestrian signals shall be rectangular or square in shape and shall contain the lettered message "DON'T WALK" on the top, and "WALK" on the bottom. The "DON'T WALK" shall be Portland Orange and the "WALK" shall be Lunar White in color.

The pedestrian signals shall be illuminated during "Stop and Go" operation. They shall not be illuminated during Flashing operation. During periods of special preemption they shall generally be steady "Don't Walk".

2.0 MEANING AND APPLICATION OF COLOR AND INDICATION

2.1 STEADY RED

Steady red when used alone, vehicular traffic facing

the signal shall stop before entering the crosswalk on the near side of the intersection, or, if none, then before entering the intersection and shall remain standing until the green indication is shown.

When the steady red is used with either a green arrow or a "RIGHT TURN AFTER STOP" sign, then the vehicular traffic shall comply with the extra message.

A pedestrian facing such signal shall not enter the roadway unless he can do so safely and without interfering with any vehicular traffic, or unless a separate walk indication is shown.

2.2 STEADY YELLOW

Vehicular traffic facing the signal is thereby warned that the red indication will be exhibited thereafter or that the related green movement is being terminated.

Unless otherwise directed by a pedestrian signal, pedestrians facing such signal are thereby advised that there is insufficient time to cross the roadway.

No circular green, green arrow, or flashing yellow shall be terminated and immediately followed by a steady or flashing red without the display of a steady yellow clearance interval.

Steady yellow shall not be used in transition from steady red or flashing red to circular green, green arrow, or flashing yellow.

2.3 STEADY CIRCULAR GREEN (ALONE):

Vehicular traffic facing the signal may proceed straight through or turn left unless an official sign prohibits any of those movements. Moreover, it must yield the right of way to pedestrians within the intersection or adjacent crosswalk and to vehicles lawfully within the intersection at the time such signal is exhibited.

Pedestrians facing such signal may proceed across the roadway within any marked or unmarked crosswalk unless directed otherwise by a pedestrian signal.

2.4 GREEN ARROW

2.4.1 GENERAL

The green arrow shall be reserved to indicate those vehicular movement(s) which are protected

by the delay or restriction of opposing or conflicting vehicular movement(s) across or into the path of that vehicular movement indicated by the green arrow.

Traffic directed by a green arrow, or combination of circular green or green arrow or combination of green arrows, shall yield the right-of-way to pedestrians within the intersection or adjacent crosswalk and to vehicles lawfully within the intersection at the time such signal is exhibited.

2.4.2 STRAIGHT THROUGH GREEN ARROW

Vehicular traffic facing the signal may proceed through, but shall not turn right or left unless a full green or another arrow is present and illuminated.

Pedestrians facing the signal may proceed across the roadway within the appropriate marked or unmarked crosswalk unless directed otherwise by a pedestrian signal.

Straight-through green arrow may be shown alone, with another arrow or with steady yellow (when preceded by circular green or other arrow); but never with a circular steady red.

2.4.3 LEFT TURN GREEN ARROW

Vehicular traffic facing a left turn green arrow may proceed to the left, but shall not turn right or go straight through unless another arrow or circular green is present and illuminated.

No pedestrian facing such a signal alone shall enter the roadway unless he can do so safely and without interfering with any vehicular traffic.

A left turn green arrow shall be shown with a steady red when through movements are stopped on that approach.

A left turn green arrow may be shown alone over an exclusive left turn lane, either so designed or signed, when accompanied by through movements on that approach.

A left turn green arrow may be used with circular green, another arrow, steady yellow (when preceded by circular green), or steady red.

2.4.4 RIGHT TURN GREEN ARROW

Vehicular traffic facing a right turn green arrow may proceed to the right but shall not turn left or go straight through unless another arrow or circular green for that approach is present and illuminated.

No pedestrian facing such a signal alone shall enter the roadway unless he can do so safely and without interfering with any vehicular traffic.

A right turn green arrow may be used with a steady red, steady yellow (when preceded by circular green) or another arrow. It should not be illuminated in the same signal face with a circular green. Its use with a steady red should be limited to intersections where the cartway into which the turn is permitted is sufficient in width to accept the turn and any other movement permitted into that cartway at that time without conflict.

(Refer to Figures 10 and 11)

2.5 FLASHING RED (STOP SIGNAL)

When a red lens is illuminated by intermittent flashes, drivers of vehicles shall stop before entering the intersection, and the right to proceed shall be subject to the rules applicable after making a stop at a stop sign.

Stop signs shall not be used at red "Flashing Signals" but should be used at red "Flashing Beacons".

2.6 FLASHING YELLOW (CAUTION SIGNAL)

When yellow is illuminated with intermittent flashes, drivers of vehicles may proceed through the intersection or past such signal with more than ordinary caution.

Transitions may be made directly from circular green, green arrow, steady red, or steady yellow to the flashing yellow indications.

2.7 PEDESTRIAN SIGNALS

2.7.1 DON'T WALK, Flashing

While the DON'T WALK indication is flashing, no pedestrian shall start to cross the roadway in the direction of the indication, but any pedestrian who has partly completed his crossing during the WALK indication shall proceed to a sidewalk, or to a safety island.

2.7.2 DON'T WALK, Steady

While the DON'T WALK indication is steady, no pedestrian shall cross the roadway in the direction of the indication.

2.7.3 WALK, Flashing

While a WALK signal is flashing, pedestrians facing the signal indications may proceed across the roadway in the direction of the signal indication realizing that the motoring traffic also has a FULL Green signal indication for the parallel street. (Such operation is no different than the pedestrian using the same full green signal as the motorist, but does provide for better location of signal heads for pedestrian and vehicular use and ALSO allows for a separate and longer pedestrian clearance interval to better meet their needs.)

2.7.4 WALK, Steady

While the WALK indication is steadily illuminated, pedestrians facing the signal indications may proceed across the roadway in the direction of the signal indication and shall be given exclusive right-of-way by all vehicles. (Vehicles will not be permitted to enter or turn across these pedestrian crosswalks thereby providing the pedestrian with an exclusive movement.)

2.7.5 APPLICATION OF PEDESTRIAN SIGNAL INDICATIONS

Pedestrian signal indications shall be installed in conjunction with vehicular traffic signals already meeting one or more of the traffic signal warrants set forth in Section 711-1 of the regulations under any of the following conditions:

1. When a traffic signal is installed under the pedestrian volume or school crossing warrant.
2. When an exclusive interval or phase is provided or made available for pedestrian movement in one or more directions with all conflicting vehicular movements being stopped.
3. When vehicular indications are not visible to pedestrians such as one-way streets, at "Tee" intersections; or when the vehicular indications are in a position which would not adequately serve pedestrians.

4. At established school crossings at intersections signalized under any warrant.

Pedestrian signal indications should also be installed under any of the following conditions:

1. When any volume of pedestrian activity requires use of a pedestrian clearance interval to minimize vehicle-pedestrian conflicts or to assist pedestrians in making a safe crossing.
2. When multi-phase or split-phase timing would tend to confuse pedestrians guided only by vehicle signal indications and any volume of pedestrian activity is present.
3. When pedestrians cross part of the street, to or from an island, during a particular interval where they should not be permitted to cross another part of that street during any part of the same interval.

3.0 NUMBER OF SIGNAL FACES

3.1 GENERAL

There shall be a minimum of two vehicular signals for the through movement at each approach to an intersection.

3.2 THIRD APPROACH SIGNALS

A third signal for through traffic shall be considered when:

- (a) The nearest signal face is more than 120 feet beyond the stop line;
- (b) The desired visibility is not clear due to the approach grades or angularity;
- (c) Conditions of sunlight, background lighting or glare behind the signal impairs visibility;
- (d) Other unusual conditions dictate.

3.3 TURN SIGNALS

When the left or right turning movement is terminated at a time other than the through movement for that approach, a separate signal face shall be displayed for the turning movement in addition to the two (2) signal faces

for the through movement and a sign "Left Turn Signal" or "Right Turn Signal" (R 18-2L or R 18-2R) shall be located close to the turning signal.

When the left or right turn movement is followed by the Circular Green, the left or right green arrow may be displayed with the approach signal. The left arrow with the signal to the left, the right arrow with the signal to the right of that approach.

3.4 PEDESTRIAN SIGNAL

Where used there shall be a minimum of two (2) pedestrian signals visible for each crosswalk (one in each direction) so that there is a signal in the line of vision of pedestrians crossing in any direction.

4.0 LOCATION OF SIGNAL FACES

4.1 GENERAL

Approach signals shall be preferred over lane control signals. The minimum horizontal distance between signal faces for the same approach shall be 8 feet.

4.2 DISTANCE FROM STOP LINE

The nearer of the two primary signals for the through movement shall not be less than 20 feet from the stop line and the further signal shall be at least 40 feet beyond the normal stop line. However, if the further signal must be less than 40 feet beyond the normal stop line, it shall be post mounted on the far right and within two (2) feet of the righthand curb extended.

It is desirable to keep both signals between 40 and 60 feet of the stop line but in no case shall the further signal be more than 120 feet beyond the stop line.

4.3 LATERAL PLACEMENT

The lateral placement of both of the primary signals for the through movement shall be such that they will be visible from a point equal to or greater than the following distances from the stop line.

Established
Speed Limit
In MPH

Minimum Visibility
Distance in Feet

<u>20</u>	<u>100</u>
<u>25</u>	<u>175</u>
<u>30</u>	<u>250</u>
<u>35</u>	<u>325</u>
<u>40</u>	<u>400</u>
<u>45</u>	<u>475</u>
<u>50</u>	<u>550</u>
<u>55</u>	<u>625</u>
<u>60</u>	<u>700</u>

On Streets or highways with established speeds equal to or greater than 35 mph, the third signal shall be installed or the motorist must be adequately warned by suitable signs, supplemented by a flashing yellow beacon when needed.

4.4 TURN SIGNALS

A separate signal and appropriate sign for exclusive left or right turning movements shall be mounted to provide maximum visibility for the traffic lane to which it applies.

4.5 PEDESTRIAN SIGNALS

Pedestrian signals shall be mounted with the bottom of the signal not less than 7 feet nor more than 10 feet above the sidewalk level so that there is a signal in the line of vision of pedestrians crossing in any direction.

The DON'T WALK indication shall be mounted directly above or integral with the WALK indication.

Pedestrian signals may be mounted separately or on the same support with vehicular signals. When mounted with vehicular signals there shall be a physical separation between the signal groupings. The pedestrian signal head shall be so positioned and adjusted as to provide maximum visibility at the start of the controlled crosswalk.

5.0 POSITION OF LENSES

5.1 VERTICAL SIGNAL FACE

In a vertical signal face, the relative positions of the lenses from top to bottom shall be:

Circular Red

Circular Yellow

Circular Green

Straight Thru Green

Left Turn Green

Right Turn Green

5.2 HORIZONTAL SIGNAL FACE

In a horizontal signal face, the relative positions of the lenses from left to right shall be:

Circular Red

Circular Yellow

Left Turn Green Arrow

Circular Green

Straight Thru Green Arrow

Right Turn Green Arrow

5.3 INVERTED "T" MOUNTING

5.3.1 GENERAL

Combinations of a circular green lens with a green arrow lens, or combination of two green arrow lenses may be mounted horizontally below the vertical aligned red and yellow lenses as follows:

5.3.2 LEFT APPROACH SIGNAL

Left-turn green arrow with circular green to the right.

Left-turn green arrow with straight-through green arrow to the right.

Circular green with straight-through green arrow to the right.

5.3.3 RIGHT APPROACH SIGNAL

Right-turn green arrow with circular green to the left.

Right-turn green arrow with straight-through green arrow to the left.

Circular green with straight-through green arrow to the left.

6.0 SIZE OF LENSES

6.1 Eight Inch (8") Lenses

The eight inch (8") lens is the standard size for vehicular traffic and should be used at most signalized intersections.

6.2 Twelve Inch (12") Lenses

The twelve inch (12") lens provides an important increase in the target value of the signal at locations where signal indications tend to be overlooked, such as:

- (a) Rural intersections with high approach speeds.
- (b) Isolated intersections where signalization might be unexpected.
- (c) Ramp terminals of high speed expressways.
- (d) Special problem locations.
- (e) Where an arrow is used a 12" lens is mandatory.

6.3 PEDESTRIAN SIGNALS

In the Gas-filled tubing type the message shall consist of cut-out letters illuminated by gas-filled tubing.

In the Incandescent type the Walk and Dont Walk indications shall be in separate signal sections. The Walk lens shall be white glass with all but the letters obscured by an opaque material. The Dont Walk lens shall be orange glass with all except the letters obscured by an opaque material.

The letters "Walk" and "Dont Walk" shall be at least three (3) inches high for a crossing where the distance from the near curb to the signal indication is 60 feet or less. For distances over 60 feet the letters shall be $4\frac{1}{2}$ inches high.

7.0 VISOR

Visors are necessary to shade the signal lenses from the sun, sky and other conditions which tend to make a lens look illuminated when it is not, or to shield the lens from motorists on other approaches who might be confused where they to see the lens.

There are three types: Standard visors, tunnel visors, and full circle visors.

8.0 LOUVERS

Louvers are used to decrease the possibility of motorists seeing signals which are not intended for them, especially at intersections where roads come together at acute angles.

Louvers shall be considered for other special applications such as left or right turn signal heads.

9.0 BACKPLATES

Backplates improve the visibility of signals otherwise impaired by background lighting, sun light, or glare behind the signal face. When used backplates shall be painted black.

10.0 PROGRAMMED SIGNAL LENSES

At locations where the visible color display of a signal face or faces must be confined to exact limits, a traffic signal face with optically programmed lenses should be used. The visibility of the color display of this traffic signal can be controlled to exact lateral and longitudinal limits and is available with twelve (12) inch lens and as a conversion kit for any standard eight (8) inch signal face. All such traffic signal faces, when used, shall be placed on a rigid mounting.

11.0 TRAFFIC SIGNALS NEAR RAILROAD OR TRANSIT GRADE CROSSINGS

At some street and highway intersections, railroad tracks pass within or near the intersection area, and at such intersections, it is essential that the control of the vehicular traffic signal be pre-empted by an approaching train, or by some other means, to avoid the conflicting aspects of traffic signals and the red flashing train approach signal, such control of traffic must assure clearance of the tracks by all vehicular traffic.

It is important to remember that train approach signals come under the jurisdiction of the Public Utility Commission at Harrisburg, Pennsylvania, and any application or request for such controls must be presented to the Commission. (In

view of the Public Utility Commission's jurisdiction over train approach signals, all vehicular signals to be located within 300 feet of a railroad grade crossing must be reviewed by the Commission before a permit for vehicular traffic signals may be issued by the Secretary of Highways.)

12.0 FLASHING OPERATION

12.1 TIME OF CHANGE

When a stop and go signal reverts or changes to flashing operation, the change shall take place at the beginning of Main Street green to assure maximum green on Main Street before transfer of right-of-way to the side street.

12.2 MISCELLANEOUS

12.2.1 Flashing operation of either signals or beacons shall be such that the indications for each approach shall have a simultaneous ON and OFF period.

12.2.2 A flashing red beacon may be used with a steady right turn green arrow, to emphasize the condition "Stop, - except when turning Right".

12.3 EMERGENCY

All traffic signal installations shall be capable of emergency flashing.

13.0 PROTECTED LEFT TURNS

13.1 ADVANCE LEFT TURN

Advance left turn movements shall be preferred.

13.2 DELAYED LEFT TURN

Delayed left turns must be avoided except under the following conditions:

- (1) "T" Intersections
- (2) Intersections of a "Two Way" Street and a "One Way" Street.
- (3) Where opposing Left Turns are prohibited by design and/or official signs.

14.0 USE OF PAVEMENT MARKINGS AND SUPPLEMENT SIGNS

14.1 PAVEMENT MARKINGS

All necessary pavement markings (such as center lane, channelizing, stop lines, crosswalk lines and lane control markers including curb markings for parking restrictions) as may be required to properly direct and control the flow of vehicular and pedestrian traffic through the proposed signalization shall be indicated and required on the condition diagram and become a part of the Traffic Signal Permit when issued.

14.2 SIGNS

All necessary signs (such as turn prohibition, lane control, one-way, parking restrictions, pedestrian control and others) as may be required to properly direct and control the flow of vehicular and pedestrian traffic through the proposed signalization shall be indicated and required on the condition diagram and become a part of the Traffic Signal Permit when issued.

14.3 ILLUMINATED SIGNS

Illuminated signs should be required where an engineering study shows that official (reflectorized) signs will not give effective performance and where extraneous light makes it impossible or difficult to read official signs.

Illuminated changeable message signs shall be installed under conditions such as: Where the Left Turn is Not Denied following the Advance Dual Left Turn, in this case the dual message would be "Left Turn Signal" and "Turn With Care". (See Figure 16)

15.0 CONTRACTS FOR INSTALLATION

General instructions, Specifications, Standard drawings and Typical examples of Condition Diagrams for the traffic signal installations are available from the

BUREAU OF TRAFFIC ENGINEERING
PENN DOT
Harrisburg, Pennsylvania 17120

APPENDIX A

Pertinent Sections of REGULATIONS

Sec. 711 TRAFFIC SIGNALS GENERAL PROVISIONS (See REGULATIONS 1967)

Sec. 711-1 TRAFFIC CONTROL SIGNALS (See REGULATIONS 1967)

Sec. 711-2 PEDESTRIAN CONTROL SIGNALS (See REGULATION-ADENDUM 1970)

Sec. 711-3 SPECIAL TRAFFIC SIGNALS (See REGULATIONS 1967)

Sec. 711-4 TRAIN APPROACH SIGNALS AND GATES (See REGULATIONS 1967)

SECTION 711-2. PEDESTRIAN CONTROL SIGNALS.

(a) Definition and Scope.

Pedestrian signals are traffic signals erected for the exclusive purpose of directing pedestrian traffic at signalized locations. They are installed in conjunction with vehicular traffic signals erected under Section 711-1 of these regulations.

These pedestrian signals consist of signal indications with the illuminated words "WALK" and "DONT WALK".

(b) Meaning of Pedestrian Indications.

The meanings of pedestrian signal indications are as follows:

1. DONT WALK, Flashing - While the DONT WALK indication is flashing, no pedestrian shall start to cross the roadway in the direction of the indication; but any pedestrian who has partly completed his crossing during the WALK indication shall proceed to a side-walk, or to a safety island.
2. DONT WALK, Steady - While the DONT WALK indication is steady, no pedestrian shall cross the roadway in the direction of the indication.
3. WALK, Flashing - While a WALK signal is flashing, pedestrians facing the signal indication may proceed across the roadway in the direction of the signal indication realizing that the motoring traffic also has a FULL GREEN signal indication for the parallel street. (Such operation is no different than the pedestrian using the same full green signal as the motorist, but does provide for better location of signal heads for pedestrians and vehicular use and ALSO allows for a separate pedestrian clearance interval to better meet their needs.)
4. WALK, Steady - While the WALK indication is steadily illuminated, pedestrians facing the signal indication may proceed across the roadway in the direction of the signal indication and shall be given exclusive right-of-way by all vehicles. (Vehicles will not be permitted to enter or turn across these pedestrian crosswalks thereby providing the pedestrian with an exclusive movement.)

(c) Application of Pedestrian Signal Indications.

Pedestrian signal indications shall be installed in

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conjunction with vehicular traffic signals already meeting one or more of the traffic signal warrants previously set forth in Section 711-1 of these regulations under any of the following conditions:

1. When a traffic signal is installed under the pedestrian volume or school crossing warrant.
2. When an exclusive interval or phase is provided or made available for pedestrian movement in one or more directions with all conflicting vehicular movements being stopped.
3. When vehicular indications are not visible to pedestrians such as one-way streets, at "Tee" intersections; or when the vehicular indications are in a position which would not adequately serve pedestrians.
4. A established school crossings at intersections signalized under any warrant.

Pedestrian signal indications should also be installed under any of the following conditions:

1. When any volume of pedestrian activity requires use of a pedestrian clearance interval to minimize vehicle-pedestrian conflicts or to assist pedestrians in making a safe crossing.
2. When multi-phase or split phase timing would tend to confuse pedestrians guided only by vehicle signal indications and any volume of pedestrian activity is present.
3. When pedestrians cross part of the street, to or from an island, during a particular interval where they should not be permitted to cross another part of that street during any part of the same interval.

(d) Types of Control.

Control of pedestrian signal indications in pretimed signals is achieved by being made a part of the timing cycle. Control of pedestrian signal indications in traffic-actuated signals shall be achieved by installation of pedestrian detector.

(e) General Design Requirement.

All pedestrian signals shall be rectangular in shape and shall contain the lettered messages WALK and DONT WALK. (The message WAIT may not be substituted as an alternate for DONT WALK.) The two basic types described below are authorized as standard for pedestrian signals:

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Gas-filled tubing type: The letters shall be at least $4\frac{1}{2}$ inches in height and shall be in two lines. The WALK indication shall be white and the DONT WALK shall be orange. The messages shall consist of cut-out letters illuminated by gas-filled tubing.

Incandescent type: The letters shall be at least 3 inches high. The WALK and DONT WALK indications shall be in separate signal sections. The WALK lens shall be white glass with either (a) all except the letters obscured by an opaque material, or (b) an opaque band at least $5\frac{5}{8}$ inches high across the center of the lens obscuring all except the letters and a band of white at the top and bottom. The DONT WALK lens shall be orange glass with all except the letters obscured by an opaque material.

Wherever a WALK indication is provided there shall also be provision for a DONT WALK signal indication. Particular care should be given to the design and construction of the gas-filled tubing type of signal so that in case of an electrical or mechanical failure of the word DONT, the word WALK will also remain dark. The red DONT WALK and green WALK is authorized in existing signal installations but not in new installations.

All pedestrian signals within an intersection used for the same operation should be of the same approved type.

(f) Location of Pedestrian Signals and Detectors.

Pedestrian signals shall be mounted with the bottom of the signal not less than 7 feet nor more than 10 feet above the sidewalk level so that there is a signal in the line of vision of pedestrians crossing in any direction.

The DONT WALK indication shall be mounted directly above or integral with the WALK indication.

Pedestrian signals may be mounted separately or on the same support with vehicular signals. When mounted with vehicular signals there shall be a physical separation between the signal groupings. The pedestrian signal head shall be so positioned and adjusted as to provide maximum visibility at the start of the controlled crosswalk.

Pedestrian-actuated signals shall have a push-button detector $3\frac{1}{2}$ to 4 feet above the surface of the sidewalk at each end of the crosswalks where actuation is required and on any island or median where a pedestrian may otherwise become stranded. A permanent-type sign explaining its use shall accompany each push-button detector, (Sec. 704-9(d)). Where two crosswalks, oriented in different directions, end at or near the same location, the positioning of pedestrian push buttons should clearly indicate which crosswalk is actuated by each push button.

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(g) Operation.

Pedestrian indications shall be steady burning or flashing as indicated in Section 711-2(b). The flashing WALK indication shall be used at all locations where the pedestrian movement is not exclusive and a possible conflict of pedestrians with turning vehicles could exist. Whenever pedestrian signals are used, the flashing DONT WALK indication shall be used for all pedestrian clearance intervals. When traffic signals at the intersection are on standard flashing operation, pedestrian signals shall be extinguished.

Three combinations of pedestrian signal intervals and vehicle signal intervals are authorized as follows:

1. Combined pedestrian-vehicular interval- Signal phasing wherein pedestrians may proceed to use certain crosswalks and vehicles are permitted to turn across these crosswalks. Such vehicles shall yield the right-of-way to pedestrians as stated in Section 1013(c) of the Vehicle Code. (The pedestrian indication shall be flashing WALK during this interval and no vehicle signal shall display a green turn arrow to permit vehicles to turn across any pedestrian crosswalk that has a WALK indication displayed.)
2. Semi-exclusive pedestrian-vehicular interval - Signal phasing wherein pedestrians may proceed to use certain crosswalks with parallel or other vehicular movements, but wherein vehicles are not permitted to enter or turn across these crosswalks during the pedestrian WALK interval. (If any vehicular movement is restricted to provide for this interval, the pedestrian warrant, Actuated Warrant No. 3, must be met. The pedestrian signal indications shall be steady WALK during this walk interval.)
3. All exclusive pedestrian phase - Signal phasing wherein pedestrians may proceed to cross the intersection in any designated crosswalk during an exclusive phase while all vehicles are stopped. (The pedestrian warrant, Actuated Warrant No. 3, must be met before this type of operation can be approved. The pedestrian indications shall be steady WALK during the walk interval of this phase.)

Vehicle-actuated controls may provide for pedestrian signal intervals timed as a normal part of the corresponding green interval for vehicles. If the minimum vehicle interval is not of sufficient length to accommodate a pedestrian WALK and clearance interval, an additional interval for pedestrians shall be provided. This interval includes a WALK interval and pedestrian clearance interval of adequate duration and shall be activated only by pedestrian actuation. In the absence of a pedestrian actuation this

interval is skipped and the DONT WALK indication remains. Where traffic signals are not of the vehicle-actuated type, pedestrian actuation may be used to provide sufficient pedestrian crossing time, or the vehicular time should be adjusted to provide the crossing time needed by pedestrians.

Under normal conditions, the minimum WALK interval should not be less than 7 seconds, so that pedestrians will have adequate opportunity to leave the curb, and in some cases complete the crossing, before the clearance interval is shown. However, the WALK interval itself need not equal or exceed the total crossing time calculated for the street width, as many pedestrians will complete their crossing during the clearance interval.

A pedestrian clearance interval shall always be provided. The message DONT WALK shall be flashed during the pedestrian clearance interval. The duration shall be sufficient to allow a pedestrian crossing in the crosswalk to leave the curb and travel to the center of the farthest traveled lane before opposing vehicles receive a green indication. Normal walking speed is assumed to be 4 feet per second.

On a street with a median at least 6 feet in width or where another type of protected pedestrian refuge exists, it may be desirable to allow only enough pedestrian clearance time on a given phase to clear the crossing from the curb to the median or other pedestrian refuge point. In the latter case if the signals are pedestrian-actuated, an additional detector shall be provided on the island.

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Supersedes 7-711-2; Pages 288,
289, 290

APPENDIX B

The following Figures are provided as a tool for better understanding the text and as a further guide in establishing policies and procedures.

Figure 1. Vertical Signal Indications

2. Signal Location for Two, Two-Way, Two-Lane Streets
3. Signal Location for a Two-Way, Two Lane Street and a Two-Way, Four Lane Street.
4. Signal Location for Two, Two-Way, Four Lane Streets.
5. Signal and Signing for a One Way Street and a Two-Way Street.
6. Signal and Signing for Two, One Way Streets.
7. Signal and Signing for End of One Way Street or "T" Intersection.
8. Color Sequence and Movement Diagram for Two Phase Operation.
9. Color Sequence and Movement Diagram for Advance Left Turn.
- 10a Color Sequence and Movement Diagram - Right Turn Permitted and Followed by Through Movement.
- 10b Color Sequence and Movement Diagram - Right Turn Permitted and Not Followed by Through Movement.
- 11a Color Sequence and Movement Diagram - Three Phase Operation.
- 11b Color Sequence and Movement Diagram - Three Phase Operation.
12. Signal Location - Left Turn Stand-by Lane - Exclusive Left Turn.
13. Color Sequence and Movement Diagram - Left Turn Stand-by Lane (Exclusive Left Turn Only).
14. Color Sequence and Movement Diagram - Exclusive Quad Left Turn.
15. Signal Location, Color Sequence and Movement Diagram - Advance Left Turn and Left Turn Not Denied.
16. Color Sequence and Movement Diagram Left Turn Stand-by Lane (Advance Dual Left Turn and Left Turn Not Denied).
17. Color Sequence and Movement Diagram - Advance and Lagging Left Turn (Lagging Must be Avoided.)

18. Color Sequence and Movement Diagram - Pedestrian - Full Exclusive Phase
19. Color Sequence and Movement Diagram - Pedestrian - Exclusive Interval
 - a. One Way Street and a Two-Way Street Pedestrian followed by Vehicular Movement
 - b. One Way Street and a Two-Way Street Vehicular followed by Pedestrian Movement
 - c. Two, One Way Streets Pedestrian followed by Vehicular Movement
 - d. Two, One Way Streets Vehicular followed by Pedestrian Movement
20. Color Sequence and Movement Diagram - Pedestrian - Combined Interval
 - a. Fixed Time Operation
 - b. Semi-Actuated Operation
 - c. Full Actuated Operation
21. Color Sequence and Movement Diagram - Pedestrian - Exclusive and Combined Interval
 - a. One Way Street and a Two-Way Street
 - b. Two, One Way Streets
22. Movement Chart for Phasing and Timing

Figure 1

Vertical Signal Indications

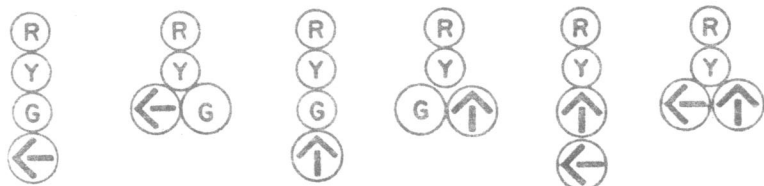
Normal Signal Installation



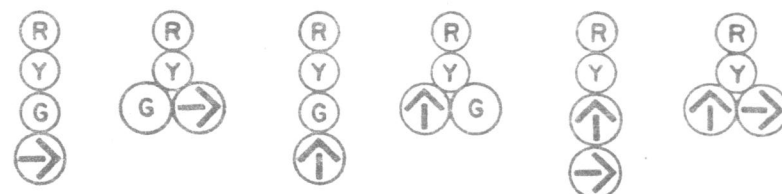
Center Approach Signal (When Needed)



Left Approach Signal



Right Approach Signal



Exclusive Left Turn Signal



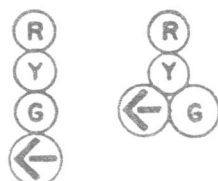
must include sign
"LEFT TURN SIGNAL"

Exclusive Right Turn Signal where mandatory by physical conditions

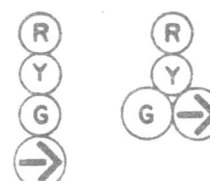


must include sign
"RIGHT TURN SIGNAL"

Advance Left Turn Signal



Right Turn Signal where permitted but not mandatory by physical conditions



○ may be 8" or 12" lenses

○ must be 12" lenses

Figure 2

Intersection of Two, Two Way, Two Lane Streets Showing Minimum Vehicular Signals only; Pedestrian movement may require Additional Signals

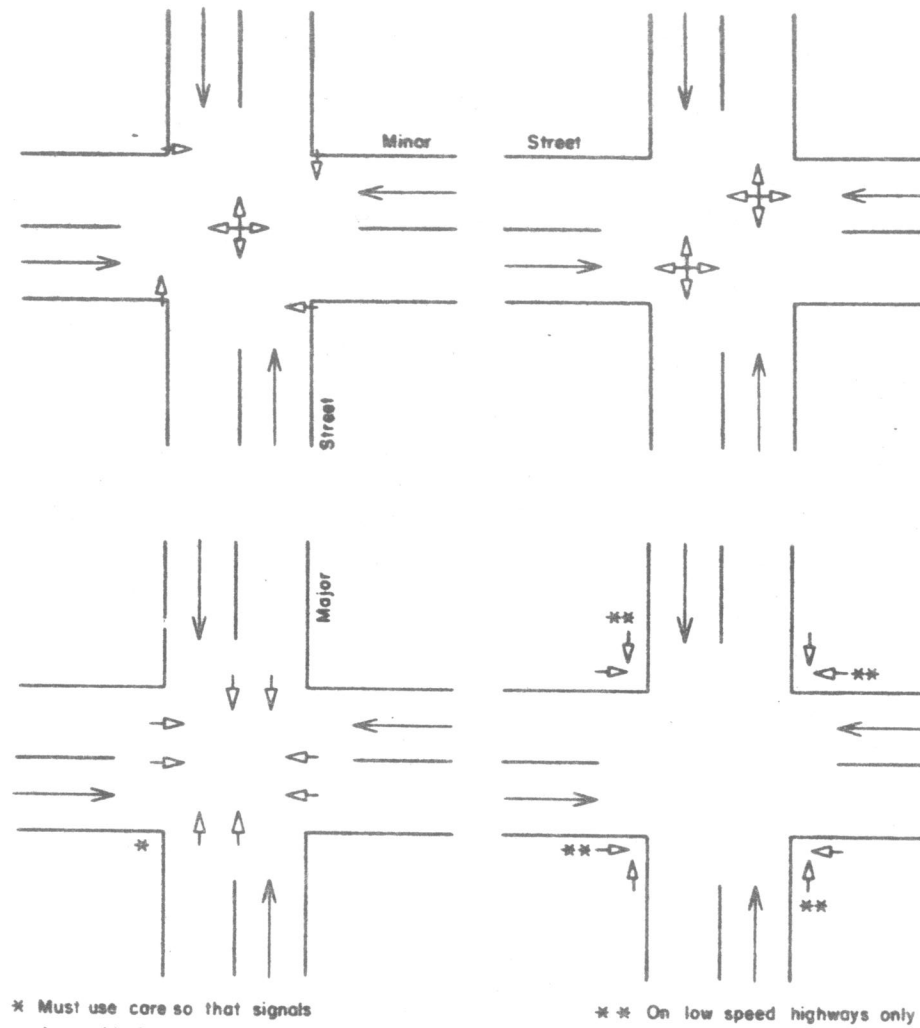


Figure 3

Intersection of a Two Way, Two Lane Street, and a Two Way, Four Lane Street
Showing Minimum Vehicular Signals only; Pedestrian movement may require Additional Signals

Acceptable Signal Placement

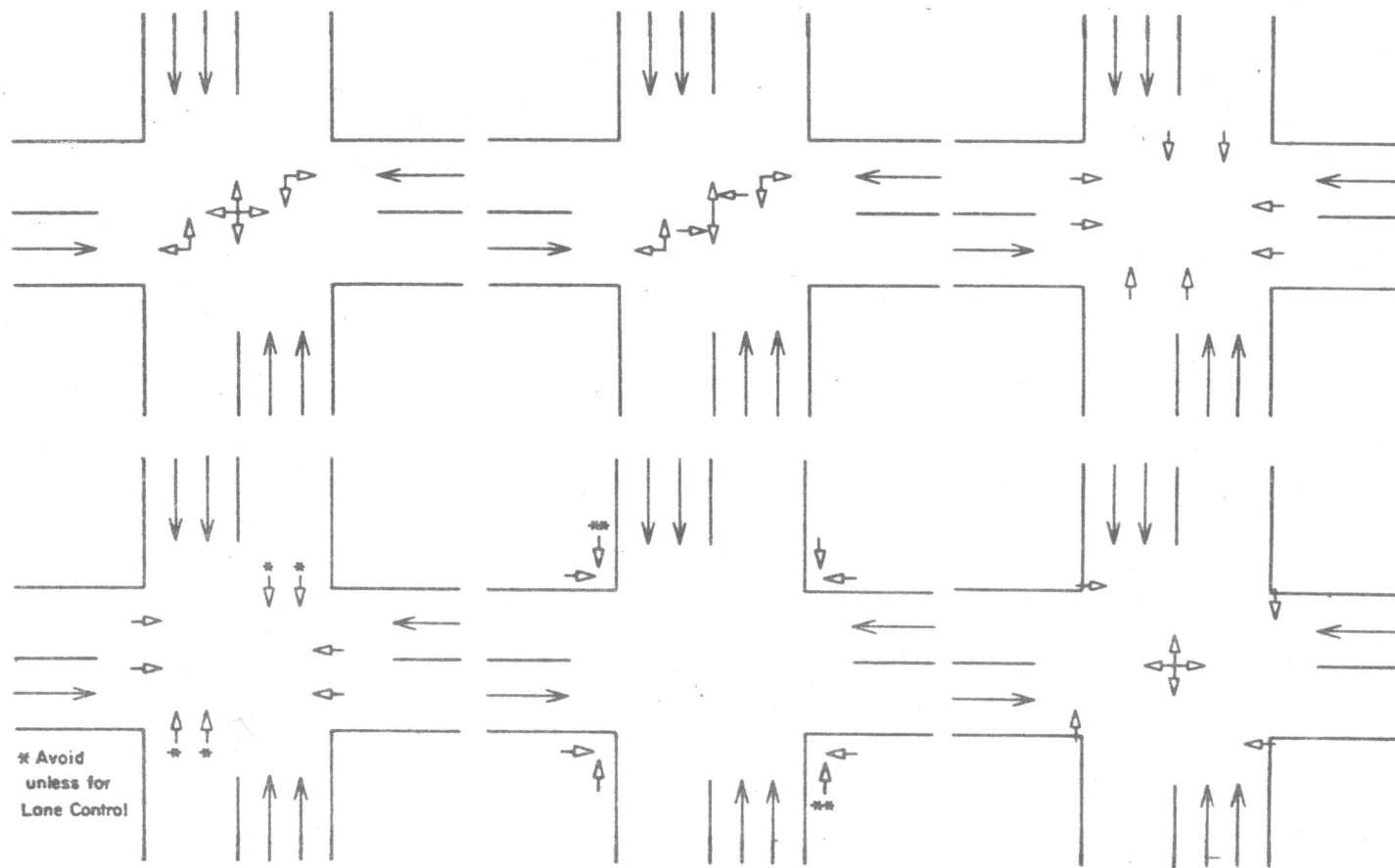
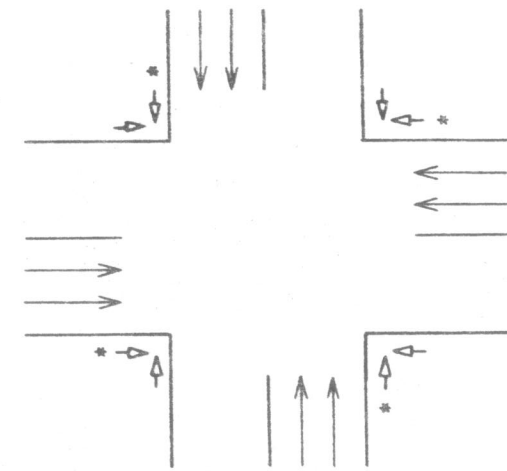
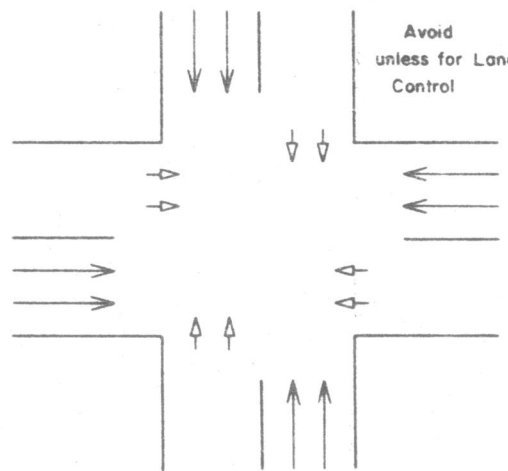
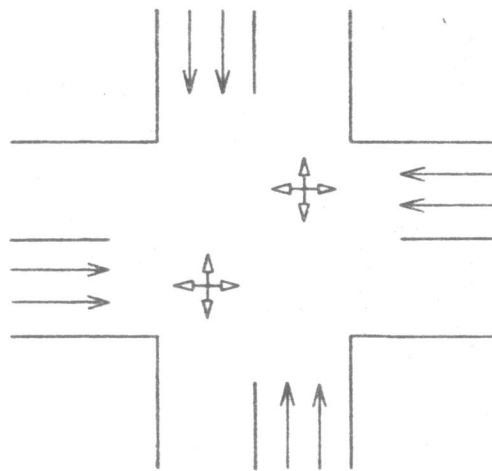
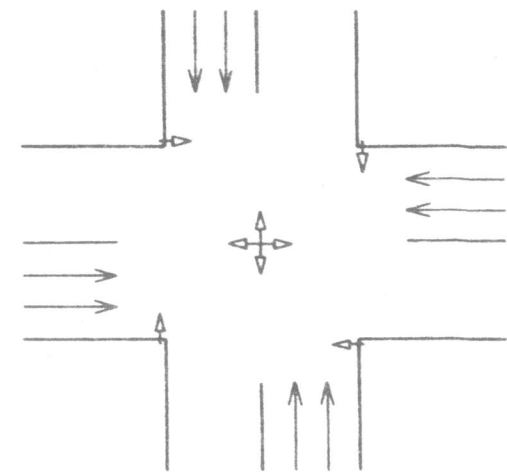
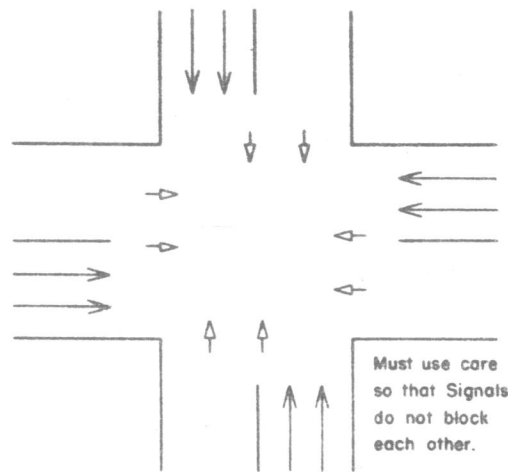
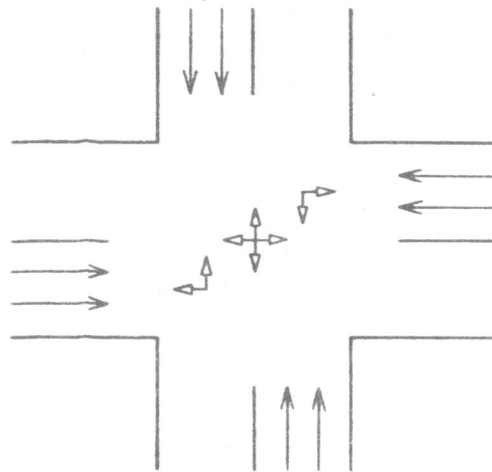


Figure 4

Intersection of Two, Two Way, Four Lane Streets

Showing Minimum Vehicular Signals only; Pedestrian movement may require Additional Signals

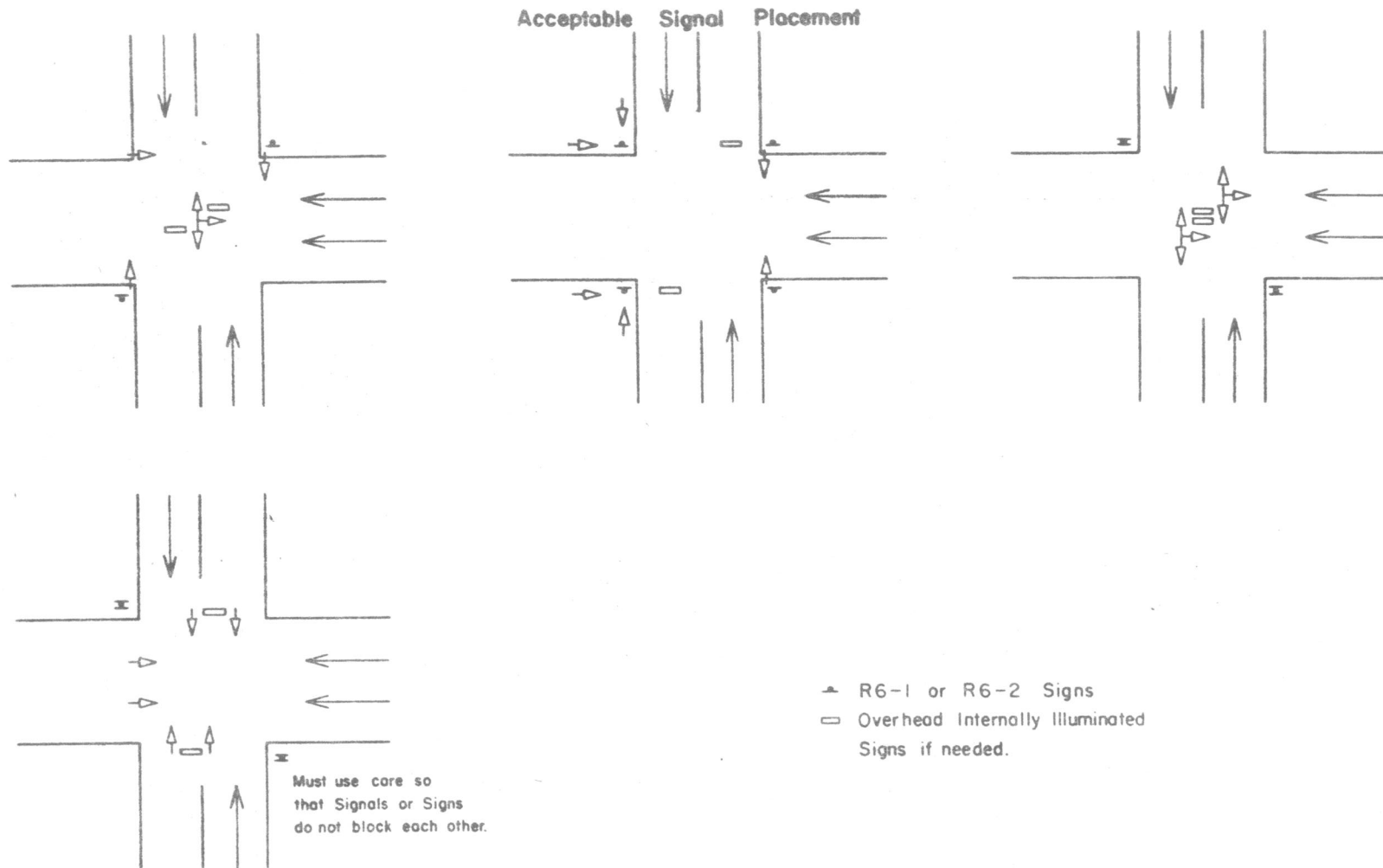


* On low speed streets only

Figure 5

A One Way Street Intersecting a Two Way Street

Showing Minimum Vehicular Signals only, Pedestrian movement may require Additional Signals



Showing Minimum Vehicular Signals only; Pedestrian movement may require Additional Signals

Acceptable Signal Placement

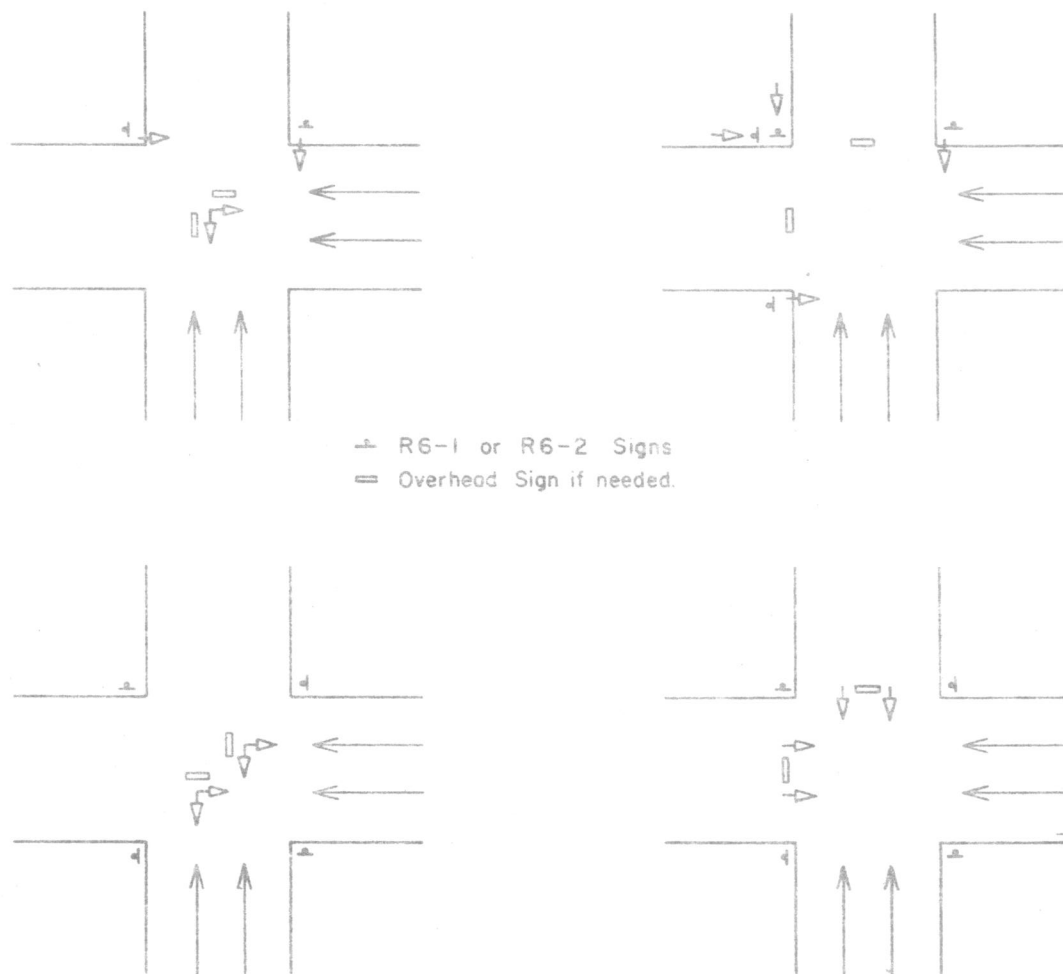
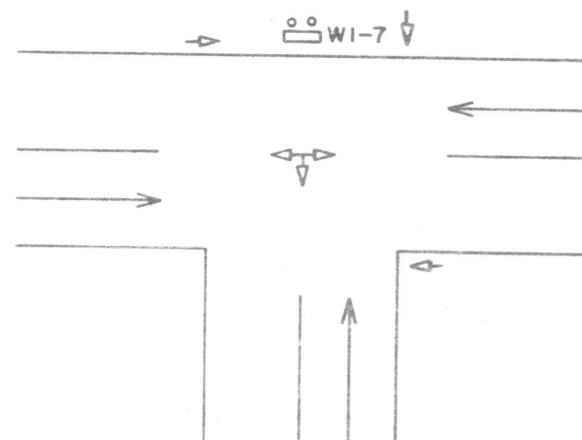
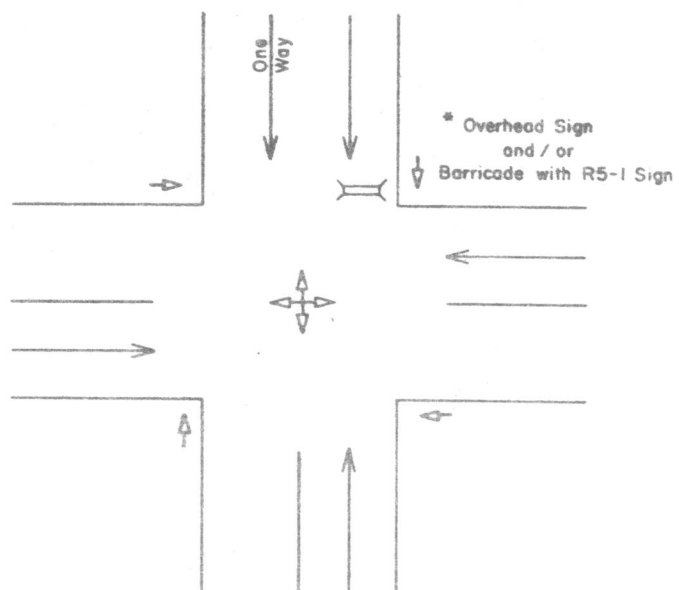


Figure 7

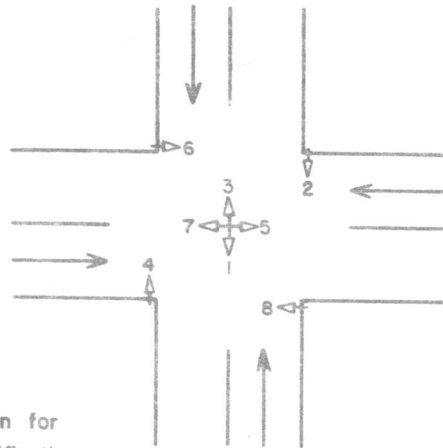
End One Way Street and T Intersections



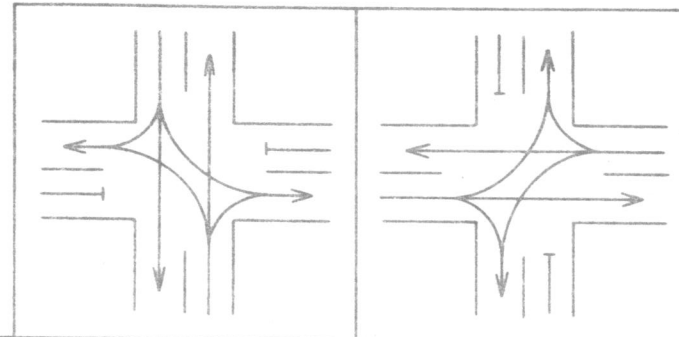
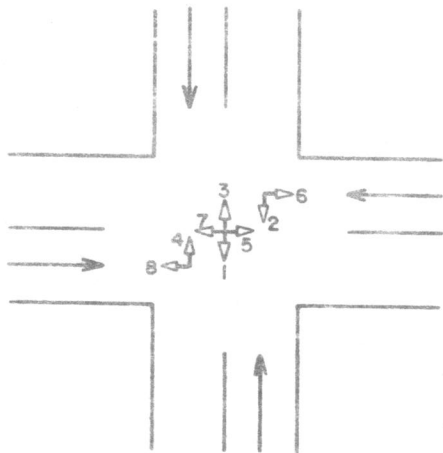
Desirable Indication
Except when Overlapping and Exclusive
Turning Movements Permitted

* Internally illuminated signing preferred

Two Phase Operation Color Sequence and Movement Diagram



Signals shown for
phasing identification
only.



Signal	Phase A			Phase B			Flash
1 - 2	G	Y	R	R	R	R	Y
3 - 4	G	Y	R	R	R	R	Y
5 - 6	R	R	R	G	Y	R	R
7 - 8	R	R	R	G	Y	R	R
Pre-Timed			⌘			⌘	Actuated
Time							Fixed
% Cycle							Initial
Dial Setting							Vehicle
							Maximum

**

⌘ Optional

**

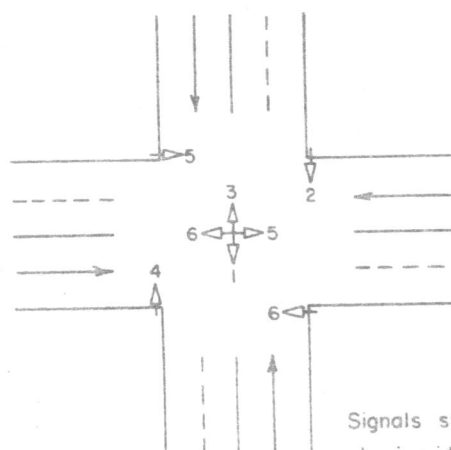


All
Signals

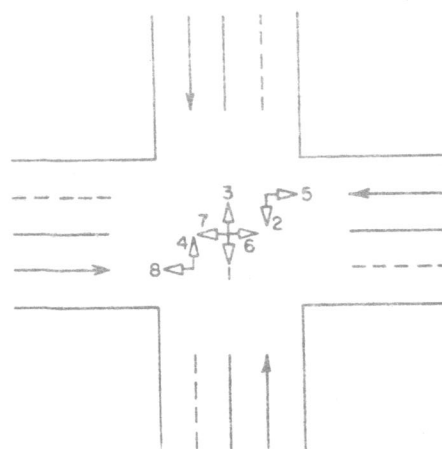
** Use one only

Figure 9

Advance Left Turn Color Sequence and Movement Diagram



Signals shown for
phasing identification
only.



Signal	Advance A		Phase A			Phase B				Flash
1	G	G	G	Y	R	R	R	R		Y
2	G	G	G	Y	R	R	R	R		Y
3 - 4	R	R	G	Y	R	R	R	R		Y
5 - 6	R	R	R	R	R	G	Y	R		R
7 - 8										
Pre-Timed		* *			*			*		Actuated
Time										Fixed
% Cycle										Initial
Dial Setting										Vehicular
										Maximum

* Optional
** 3 Sec. min.

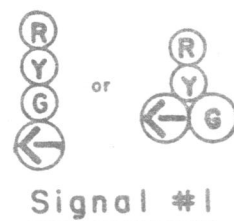
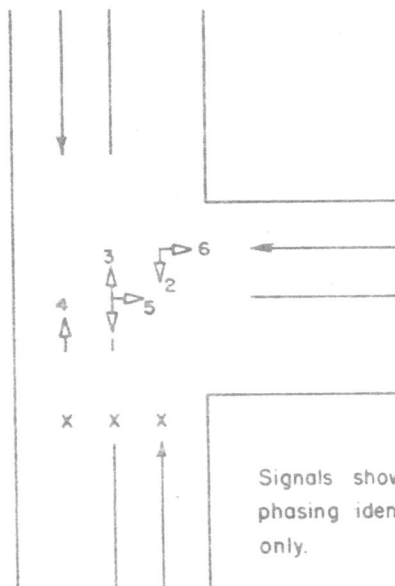


Figure 10 (a)

Right Turn Arrow - When Followed By Thru Movement

(Right Turn Arrow in Right Approach Signal)



1 & 3
4 & 5



2



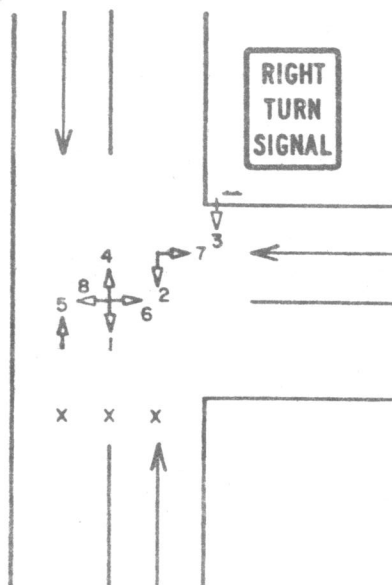
Signals	Phase A			Phase B			Flash
1	G	Y	R	R	R	R	Y
2	G	→	→	→	→	→	Y
3	G	Y	R	R	R	R	Y
4	G	Y	R	R	R	R	Y
5 - 6	R	R	R	G	Y	R	R
			*			*	

* Optional

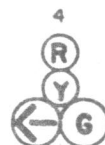
X Pedestrian crosswalk shall not be indicated on this approach.

Right Turn Arrow-When Not Followed By Thru Movement

(Requires "Right Turn" Signal)



Signals shown for
phasing identification
only.



or



Signals	Phase A			Phase B			Advance A			Flash
1-2	G	Y	R	R	R	R	R	R		Y
3	G	Y →	R →	R →	Y	R	R	R		Y
4	G	Y	R	R	R	R	G ←	G		Y
5	G	Y	R	R	R	R	G	G		Y
6-7-8	R	R	R	G	Y	R	R	R		R
		3	2		3	2				

*

*

**

* Optional

** Mandatory

X Pedestrian crosswalk shall not be
indicated on this approach.

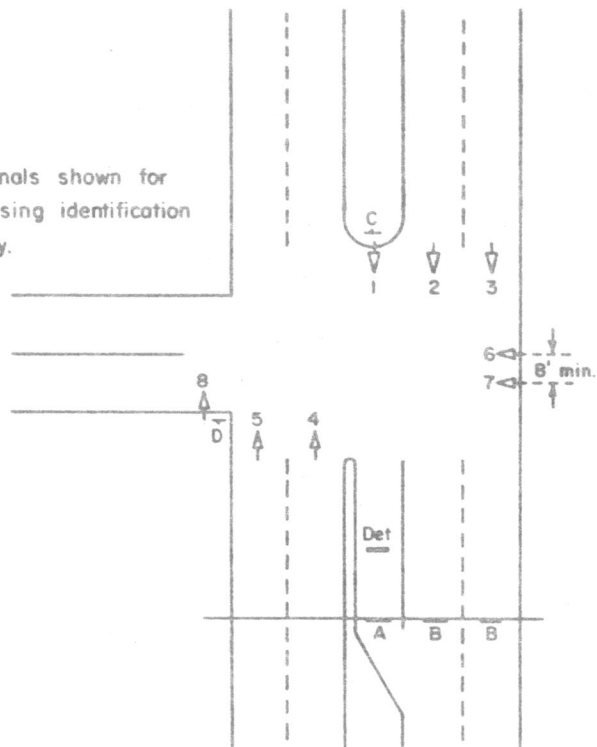
Figure 11(a)

Three Phase Operation

(Advance Left Turn)

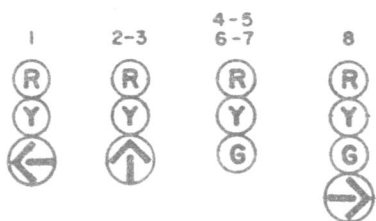
(Requires "Right Turn" Signal)

Signals shown for
phasing identification
only.

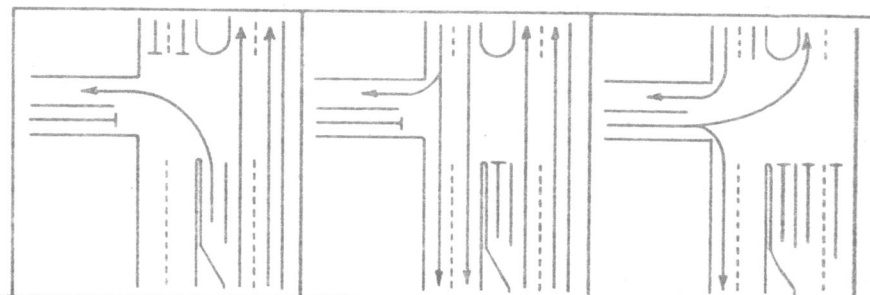


A B C D

 Signs



Signals



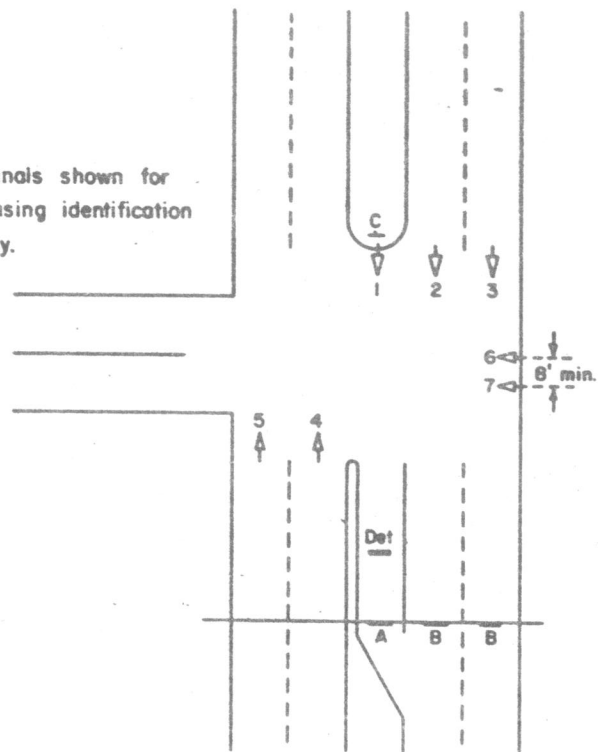
Signal	Phase A			Phase B			Phase C		
1	←	Y	R	R	R	R	R	R	R
2	↑	↑	↑	↑	Y	R	R	R	R
3	↑	↑	↑	↑	Y	R	R	R	R
4	R	R	R	G	Y	R	R	R	R
5	R	R	R	G	Y	R	R	R	R
6-7	R	R	R	R	R	R	G	Y	R
8	R	R	R	G	Y →	R →	R →	Y	R

Three Phase Operation

(Delayed Left Turn)
(Right Turn Arrow in Right Approach Signal)

(Delayed Left Turn)

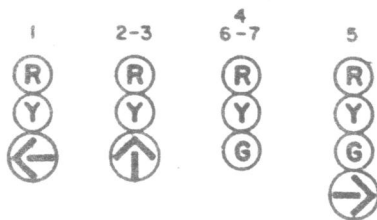
Signals shown for
phasing identification
only.



A

B Signs

C



Signals

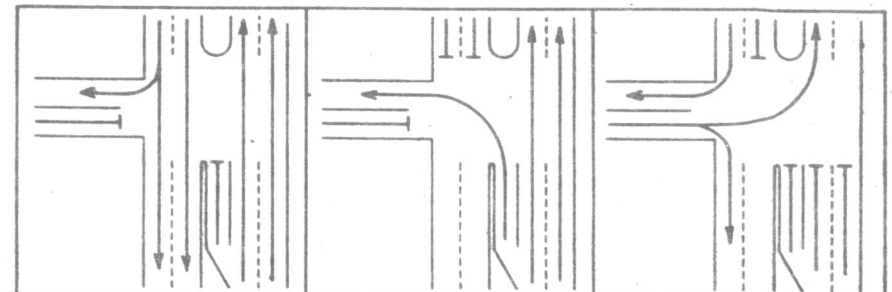
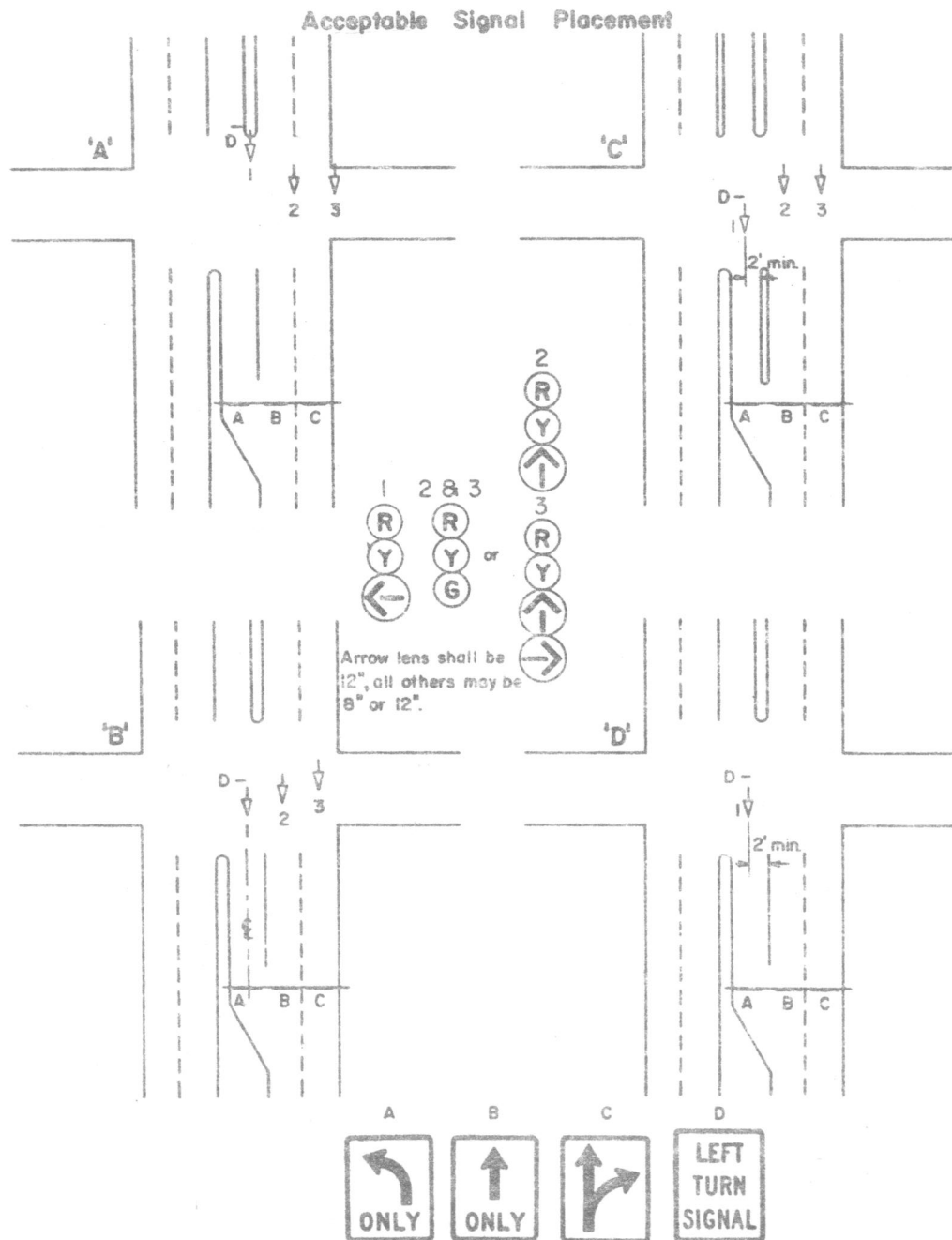
[illegible]

Figure 12

Left Turn Stand by Lanes (Exclusive Left Turn)

Showing Minimum Vehicular Signals only; Pedestrian movement may require Additional Signals

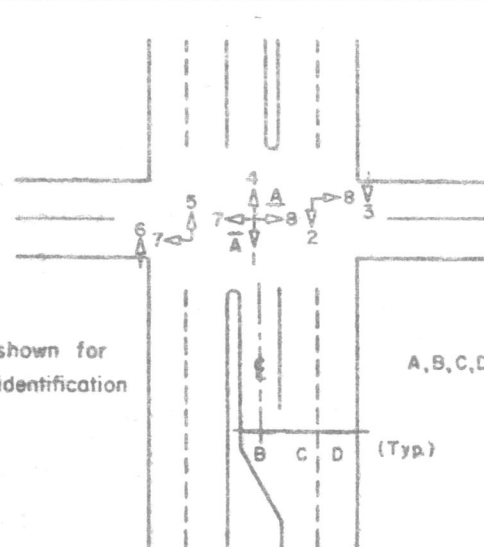


Note:

- Signal 2 & 3 may show circular green or green arrows if opposing left turn lane is present and signalized for protected movement.
- Signal 2 & 3 shall show circular green only if opposing left turn is not signalized for protected movement.
- Near Side Island Signal Auxiliary only, signal 1 of any sketch may be used with 2 & 3 of other sketches.
- Signs 'A', 'B' and 'C' should be used when there is any question of lane assignment on proper operation of intersection.

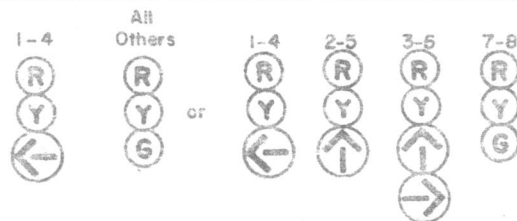
Provided by Construction or Signs and Pavement Markings

Signals	AL1 + AL2			AL1 + ASI			AL2 + AS2			ASI + AS2			B			Flash
1	R	① Y	① R	R	R	R	←	Y	R	R	R	R	R	R	R	
2	R	R	R	R	R	R	G	④ Y	④ R	G	⑤ Y	⑤ R	R	R	R	
3	R	R	R	R	R	R	G	④ Y	④ R	G	⑤ Y	⑤ R	R	R	R	
4	R	② Y	② R	←	Y	R	R	R	R	R	R	R	R	R	R	
5	R	R	R	G	③ Y	③ R	R	R	R	G	⑥ Y	⑥ R	R	R	R	
6	R	R	R	G	③ Y	③ R	R	R	R	G	⑥ Y	⑥ R	R	R	R	
7-8	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	



Signals shown for
phasing identification
only.

A, B, C, D see signs



- ① Remains R over ← when followed by AL2 + AS2
- ② Remains R over ← when followed by AL1 + ASI
- ③ Remains G when followed by ASI + AS2
- ④ Remains G when followed by ASI + AS2
- ⑤ Remains G when followed by AL2 + AS2
- ⑥ Remains G when followed by AL1 + ASI

Figure 14

Exclusive Quad Left Turn-Movement and Color Sequence

	AL1+AL2			AL1+AS1			AL2+AS2			AS1+AS2			BL1+BL2			BL1+BS1			BL2+BS2			BS1+BS2			
Signals																									Flash
1	R	Y①	R①	R	R	R	←	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	Y
2-3	R	R	R	R	R	R	↔	Y④	R④	↔	Y⑤	R⑤	R	R	R	R	R	R	R	R	R	R	R	R	Y
4	R	Y②	R②	←	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	Y
5-6	R	R	R	↔	Y③	R③	R	R	R	↔	Y⑥	R⑥	R	R	R	R	R	R	R	R	R	R	R	R	Y
7	R	R	R	R	R	R	R	R	R	R	R	R	←	Y⑦	R⑦	R	R	R	←	Y	R	R	R	R	R
8-9	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	↔	Y⑩	R⑩	↔	Y⑪	R⑪	R
10	R	R	R	R	R	R	R	R	R	R	R	R	←	Y⑧	R⑧	←	Y	R	R	R	R	R	R	R	R
11-12	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	↔	Y⑨	R⑨	↔	Y⑫	R⑫	↔	Y⑬	R⑬	R
Fixed																									
Initial																									
Interval																									
Vehicle																									
Interval																									
Maximum																									

1 Remains ← if followed by AL2 + AS2

2 " ← " " " AL1 + AS1

3 " ↔ " " " AS1 + AS2

4 " ↔ " " " AS1 + AS2

5 " ↔ " " " AL2 + AS2

6 " ↔ " " " AL1 + AS1

AL1 "A" Phase Left Turn 1 AS1 "A" Phase Straight Ahead 1

AL2 "A" Phase Left Turn 2 AS2 "A" Phase Straight Ahead 2

Phase B same treatment

7 Remains ← if followed by BL2 + BS2

8 " ← " " " BL1 + BS1

9 " ↔ " " " BS1 + BS2

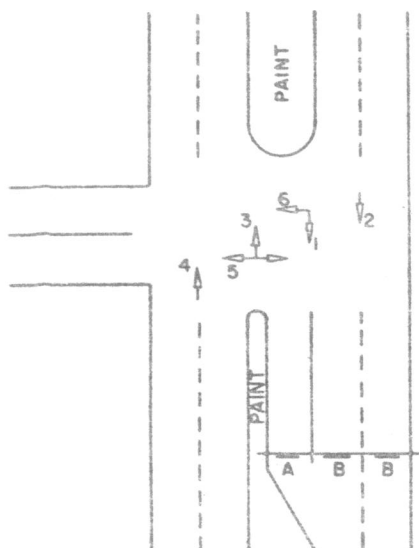
10 " ↔ " " " BS1 + BS2

11 " ↔ " " " BL2 + BS2

12 " ↔ " " " BL1 + BS1

Figure 15

Left Turn Stand by Lane (Advance Left Turn and Left Turn Not Denied) Provided By Construction or Signs and Pavement Markings



Signals	Phase A			Phase B			Phase C			Flash		
1	G	G		G	Y		R	R				
2	G	G		G	Y		R	R				
3	R	R		G	Y		R	R				
4	R	R		G	Y		R	R				
5-6	R	R		R	R		G	Y				

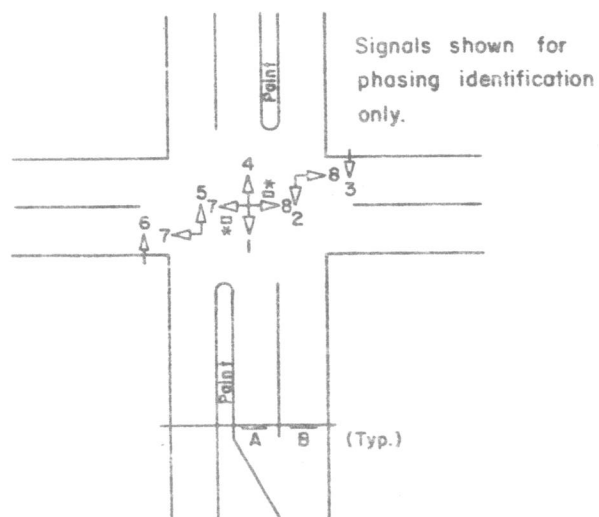


Signs



Figure 16

Advance Dual Left Turn and Left Turn Not Denied



Signs

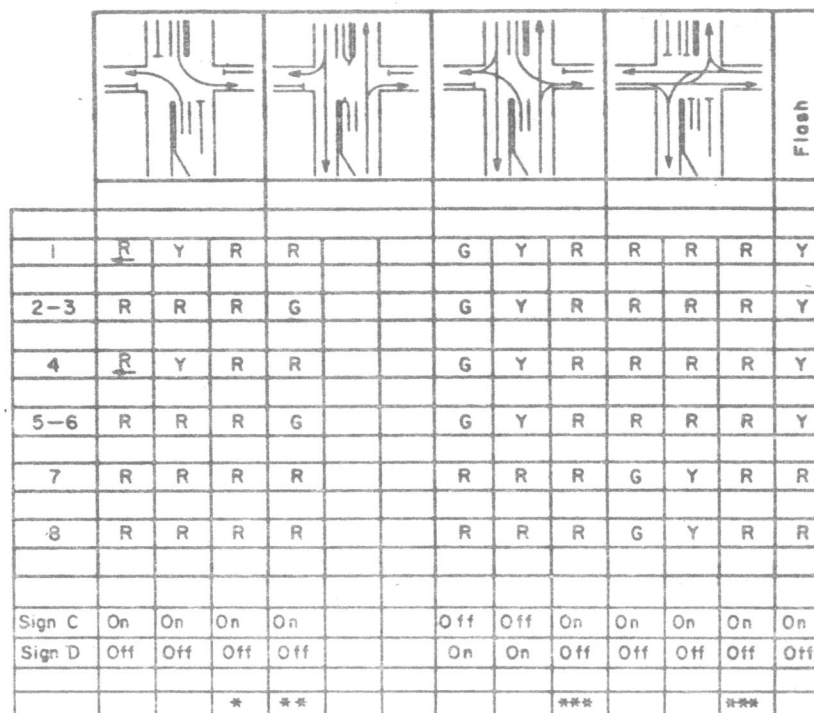
* Signs C & D Dual-Message Internally Illuminated Sign



or



Signals



* 3 Sec Minimum

**** 6 Sec Minimum**

*** Optional

2-3

5-6

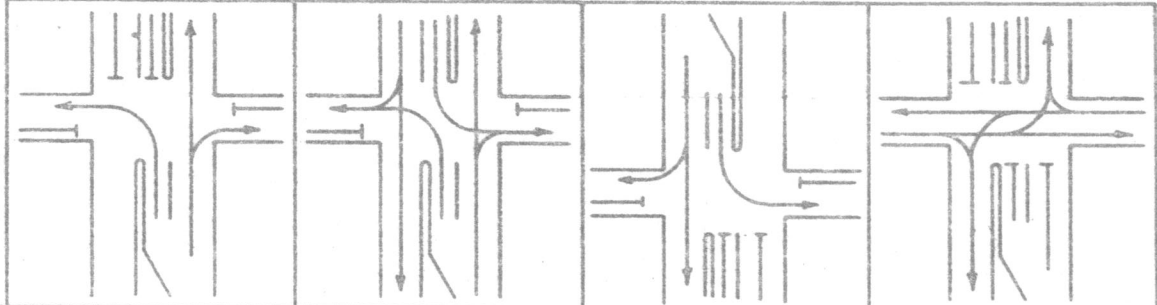
7-8



Figure 17

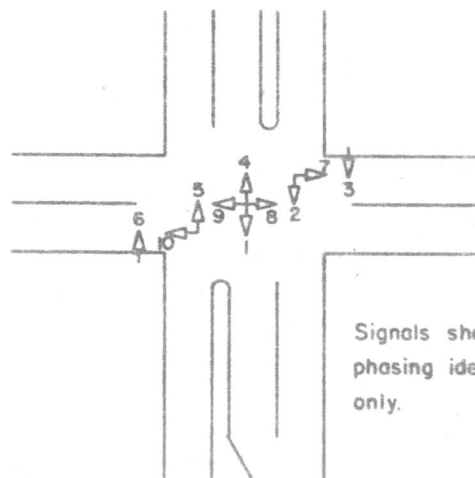
Advance and Lagging Left Turn

(Lagging must be avoided - see text)

											
Signal	Advance	A	Phase A			Lagging A		Phase B			Flash
1	G ←	G	G	Y	R	R	R	R	R	R	
2-3	G	G	G	Y	R	R	R	R	R	R	
4	R	R	G	G	G	G ←	Y	R	R	R	
5-6	R	R	G	G	G	G	Y	R	R	R	
7-8	R	R	R	R	R	R	R	G	Y	R	
9-10	R	R	R	R	R	R	R	G	Y	R	
		*			*					**	

* Mandatory

** Optional

3 Sec.
Max. (5)Signals shown for
phasing identification
only.

1 & 4



or

1 & 4

All
Others

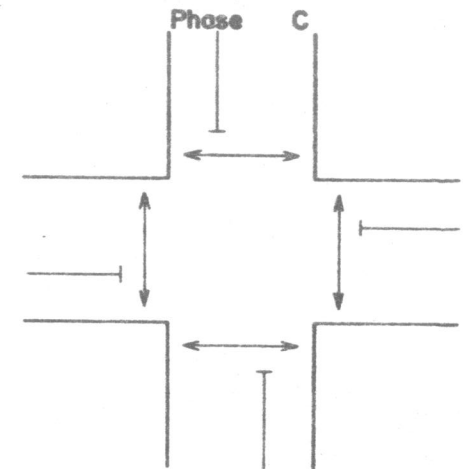
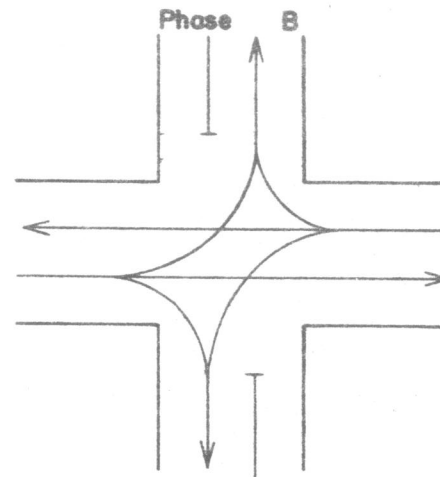
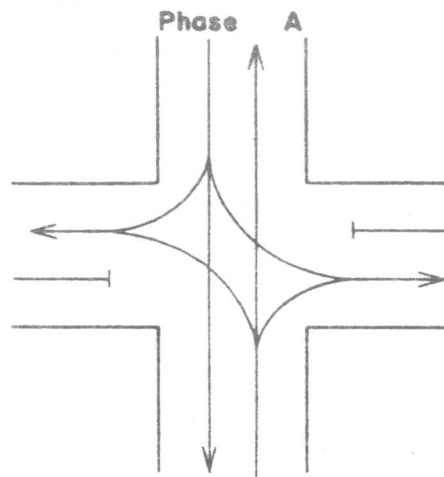
Signals

Note:

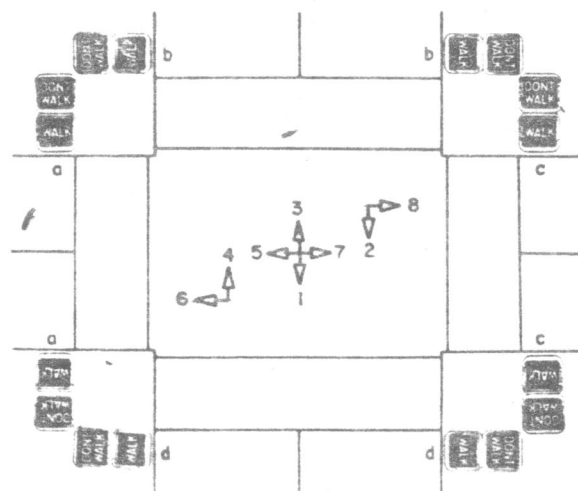
When lagging Left Turn is used
R18-3 sign required.

Figure 18

Pedestrian - Full Exclusive Phase



** W - Walk
D.W. - Don't Walk
Fl. D.W. - Flashing Don't Walk



Signals shown for
phasing identification
only.

All
Signals



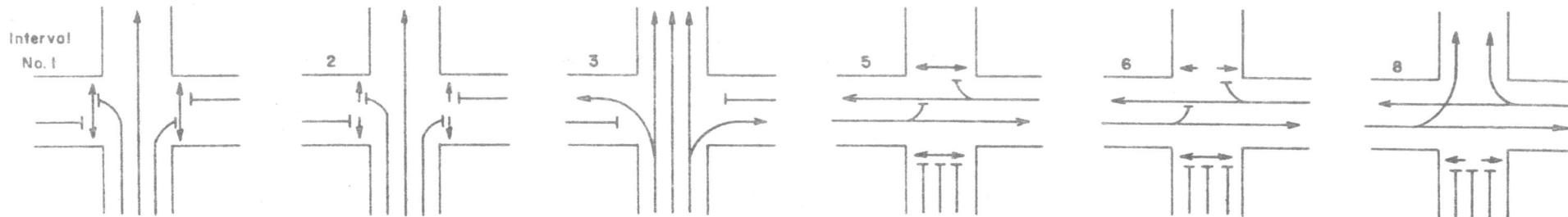
Signal	Phase A		Phase B		Phase C		F _{10st}			
1-2	G	Y		R	R		R	R		
3-4	G	Y		R	R		R	R		
5-6	R	R		G	Y		R	R		
7-8	R	R		G	Y		R	R		
a-b	D	D		D	D			FL		
c-d	W	W		W	W		W	DW		
Time	31.5	3	+	21.0	3	+	7.5	9 [*]		75
% Cycle	42	4		28	4		10	12		100%
Dial Setting	0	42	46	76	80		88	0		

+ Possible all red clearance

* Time for this interval based on length of Cross Walk
Revised November 1972

Figure 19(a)

Pedestrian - Exclusive Interval One-Way Street Intersecting a Two-Way Street (Pedestrians move first - than vehicular turns)



- Note: (1) The one-way approach must have a minimum of three lanes.
(2) Option - Turning movements may be released during pedestrian clearance interval.

Signals	1	2	3	4	5	6	7	8	9	Flash
1	↓	↓	G	Y	R	R	R	R	R	Y
2	↓	↓	G	Y	R	R	R	R	R	Y
3	R	R	R	R	↓	↓	G	G	Y	R
4	R	R	R	R	↓	↓	G	G	Y	R
5	R	R	R	R	↓	↓	G	G	Y	R
6	R	R	R	R	↓	↓	G	G	Y	R
a	W	FL	D.W.	D.W.	D.W.	D.W.	D.W.	D.W.	D.W.	
b	W	FL	D.W.	D.W.	D.W.	D.W.	D.W.	D.W.	D.W.	
c	D.W.	D.W.	D.W.	D.W.	D.W.	D.W.	D.W.	D.W.	D.W.	
d	D.W.	D.W.	D.W.	D.W.	D.W.	D.W.	D.W.	D.W.	D.W.	
Time	7.5	9.75	18	3	7.5	9.75	9	7.5	3	75
% Cycle	10	13	24	4	10	13	12	10	4	100
Dial Setting	10	23	47	51	61	74	86	96	0	

*
*
*
*

All
Signals



or

1-3-5

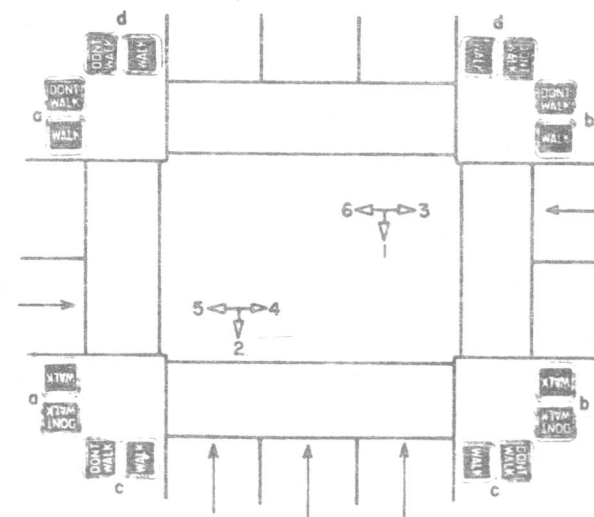


2-4-6



- * W. - Walk
D.W. - Don't Walk
Fl. D.W. - Flashing Don't Walk

Signals shown for
phasing identification
only.

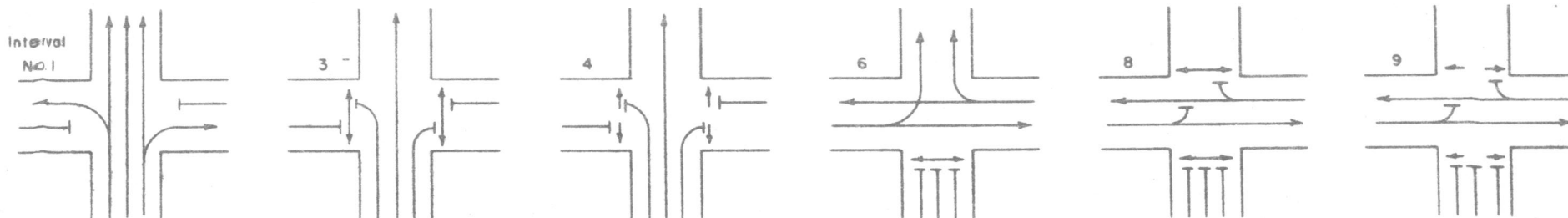


Signing one way streets see sheet #5

⊗ - May be Flashing or Steady Don't Walk.
Flashing Don't Walk Time based on length of Cross Walk

Figure 19(b)

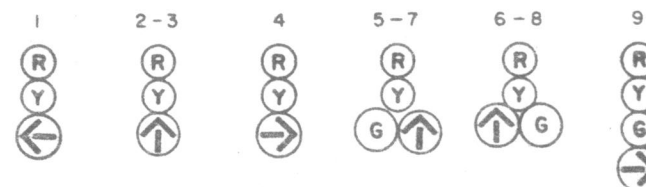
Pedestrian - Exclusive Interval **One-Way Street Intersecting a Two-Way Street** (Vehicles turn first-then pedestrian movement)



Signals	1	2	3	4	5	6	7	8	9	10	Flash
1	←	Y	R	R	R	R	R	R	R	R	
2-3	↑	↑	↑	↑	Y	R	R	R	R	R	
4	→	Y	R	R	R	R	R	R	R	R	
5	R	R	R	R	R	G	Y	R	R	R	
6	R	R	R	R	R	G	Y	↑	↑	Y	
7-8	R	R	R	R	R	G	Y	↑	↑	Y	
9	R	R	R	R	R	G	Y	R	R	R	
* a	D	W	D	W	W	FI	D.W.	FI	D.W.	D	D
* b	D	W	D	W	W	FI	D.W.	FI	D.W.	D	D
* c	D	W	D	W	W	FI	D.W.	FI	D.W.	D	D
* d	D	W	D	W	W	FI	D.W.	FI	D.W.	D	D
Time	18	3	7.5	6	3	18	3	7.5	6	3	7.5
% Cycle	24	4	10	8	4	24	4	10	8	4	100%
Dial Setting	2 4	2 8	3 8	4 6	5 0	7 4	7 8	8 8	9 6	0	

⊗ - May be Flashing or Steady Don't Walk.

Flashing Don't Walk Time based on length of Cross Walk



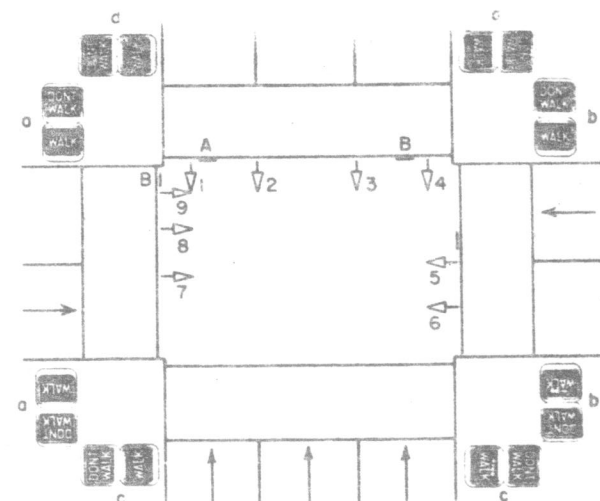
Signals



Signs

Signals shown for phasing identification only.

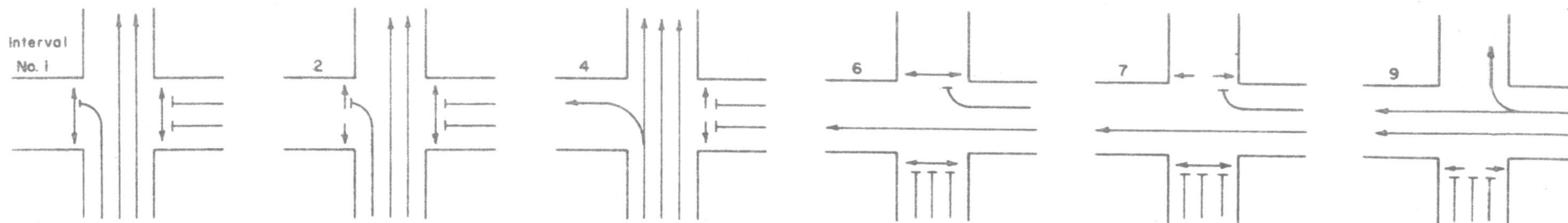
- * W - Walk
- D.W. - Don't Walk
- FI, D.W. - Flashing Don't Walk



Signing one way streets see sheet #5

Figure 19(c)

Pedestrian - Exclusive Interval Intersection of Two, One Way Streets (Pedestrians move first-then vehicular turns)

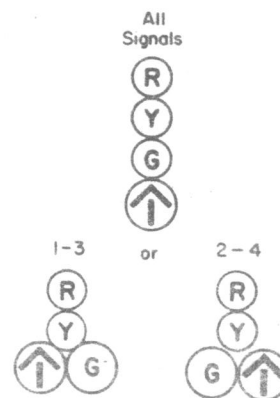


- Note (1) The one-way approach must have a minimum of three lanes.
- (2) Option - Turning movements may be released during pedestrian clearance interval.

Signals	1	2	3	4	5	6	7	8	9	10	Flash
1	↑	↑	G	G	Y	R	R	R	R	R	Y
2	↑	↑	G	G	Y	R	R	R	R	R	Y
3	R	R	R	R	R	↑	↑	G	G	Y	R
4	R	R	R	R	R	↑	↑	G	G	Y	R
a	W	Fl. D.W.	D. W.	D. W.	D. W.	D. W.	D. W.	D. W.	D. W.	D. W.	
b	W	W	W	Fl. D.W.	Fl. D.W.	D. W.	D. W.	D. W.	D. W.	D. W.	
c	D. W.	D. W.	D. W.	D. W.	D. W.	W	Fl. D.W.	D. W.	D. W.	D. W.	
d	D. W.	D. W.	D. W.	D. W.	D. W.	W	W	W	W	Fl. D.W.	Fl. D.W.
Time	7.5	9	10.5	7.5	3	7.5	9	10.5	7.5	3	7.5
% Cycle	10	12	14	10	4	10	12	14	10	4	100%
Dial Setting		10	22	36	46	50	60	72	86	96	0

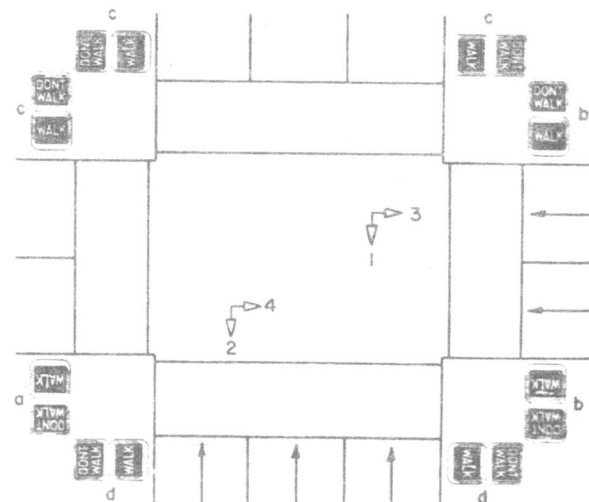
⊗ - May be Flashing or Steady Don't Walk.

Flashing Don't Walk Time based on length of Cross Walk



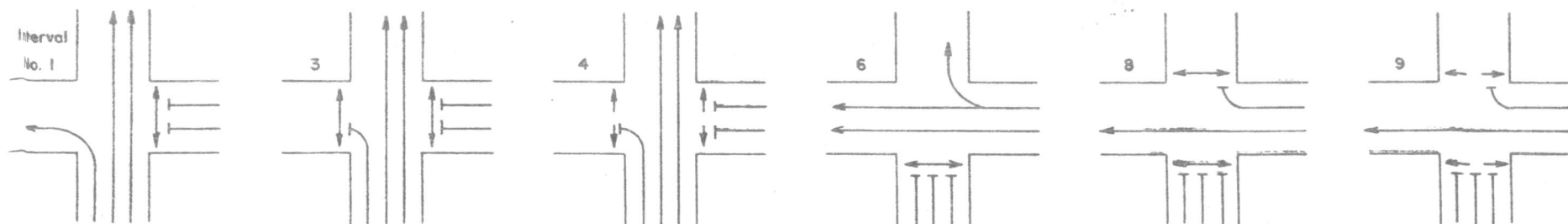
- * W. - Walk
D. W. - Don't Walk
Fl. D.W. - Flashing Don't Walk

Signals shown for phasing identification only.



Signing one way streets see sheet #5

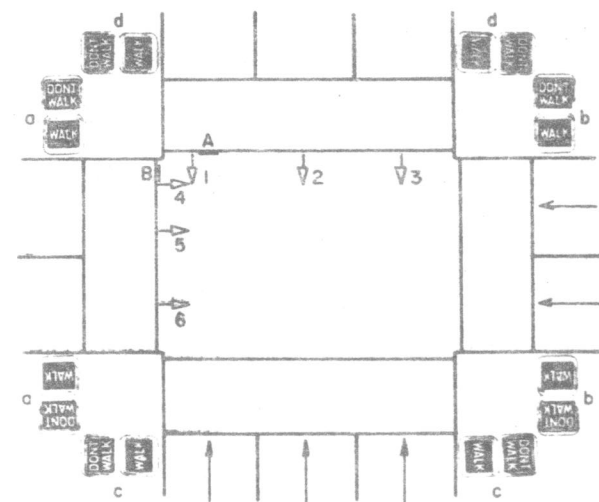
Pedestrian - Exclusive Interval
Intersection of Two, One Way Streets
(Vehicles turn first then pedestrian movement)



Signs

- * W. - Walk
- D.W. - Don't Walk
- Fl. D.W. - Flashing Don't Walk

Signals shown for
phasing identification
only.



Signing one way street see sheet #6

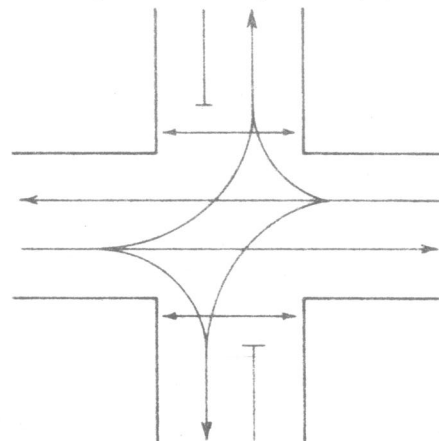
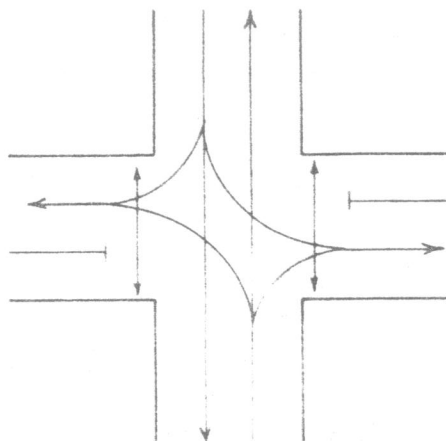
Flashing Don't Walk Time based on length of Cross Walk

⊗ May be Flashing or Steady Don't Walk.

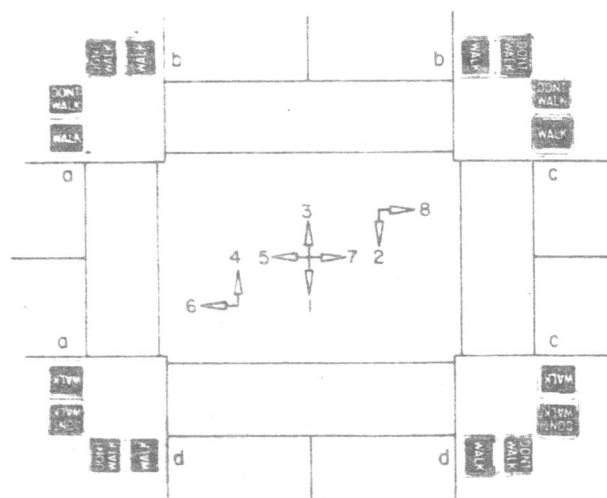
Figure 20(a)

Pedestrian - Combined Interval Intersection of Two, Two-Way Streets

(Fixed time operation)



** Fl. W.-Flashing Walk
D. W. - Don't Walk
Fl. DW - Flashing Don't Walk



Signals shown for
phasing identification
only.

All
Signals



a - b - c - d



Signal	Phase A			Phase B			
	1	2	3	4	5	6	Flash
1-2	G	G	Y	R	R	R	Y
3-4	G	G	Y	R	R	R	Y
5-6	R	R	R	G	G	Y	R
7-8	R	R	R	G	G	Y	R
a-c	Fl. W	Fl. D	Fl. D	D. W	D. W	D. W	Off
b-d	D. W	D. W	D. W	Fl. W	Fl. D	Fl. D	Off
Time	25.2	*6	3	16.8	*6	3	60 Sec
%Cycle	42	10	5	28	10	5	100%
Dial Setting	0	42	52	57	85	95	0

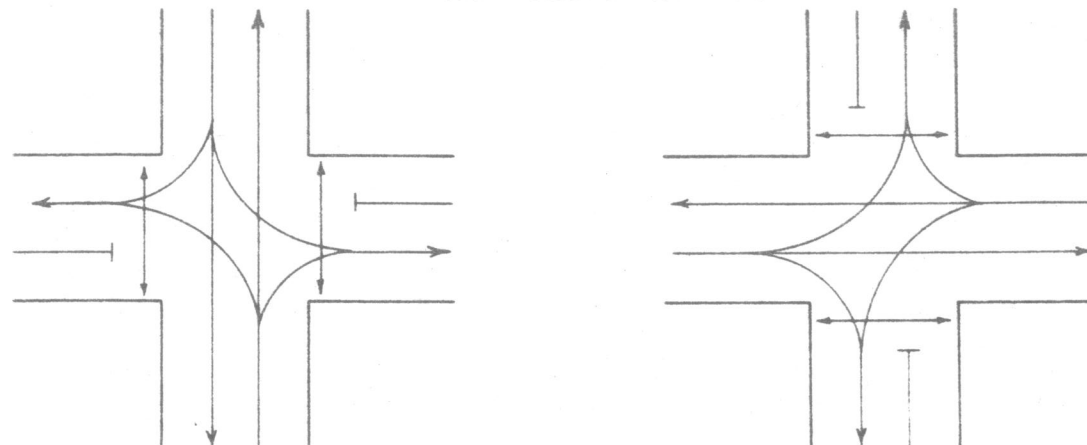
* Time for these intervals based on length of crosswalk

⊗ May be Flashing or Steady Don't Walk.

Figure 20(b)

Pedestrian - Combined Interval Intersection of Two, Two-Way Streets

(Semi-Actuated Operation)

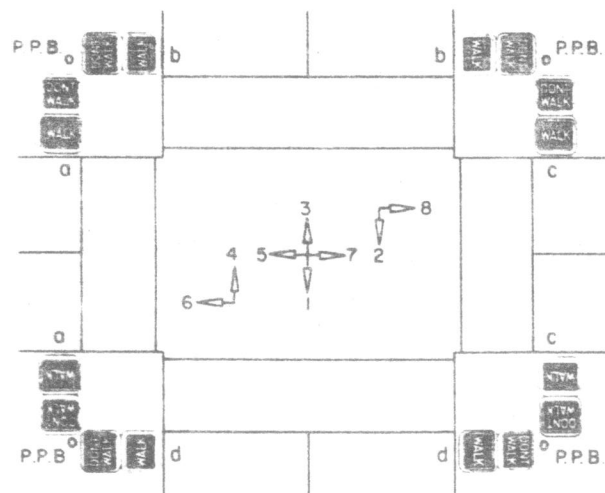


* Fl. W. - Flashing Walk

P.P.B. - Pedestrian Push Button.

D.W. - Don't Walk

Fl. D.W. - Flashing Don't Walk



Signals shown for
phasing identification only.

All
Signals

a-b-c-d



Signal	Phase A					Phase B						Flash
	1	2	3	4	5	6	7	8	9	10		
1-2	G	G	G	Y	R	R	R	R	R	R		Y
3-4	G	G	G	Y	R	R	R	R	R	R		Y
5-6	R	R	R	R	R	G	G	G	Y	R		R
7-8	R	R	R	R	R	G	G	G	Y	R		R
* a-c	Fl. W.	Fl. D. W.	D. W.	D. W.	D. W.	D. W.	D. W.	D. W.	D. W.	D. W.		
* b-d	D. W.	D. W.	D. W.	D. W.	D. W.	Fl. W.	Fl. D. W.	D. W.	D. W.	D. W.		
Ped.	"Z"	"Y"		3	2	"Z"	"Y"		3	2		
Fixed												
Initial						5						
Veh.						5						
	Min.					Max.						

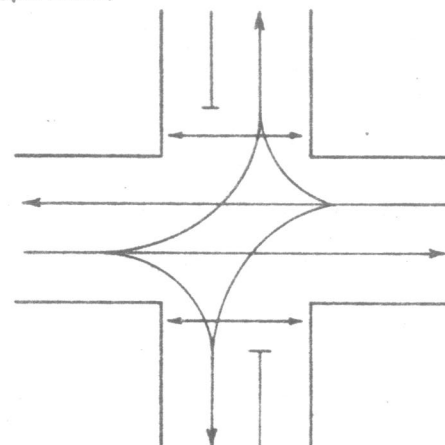
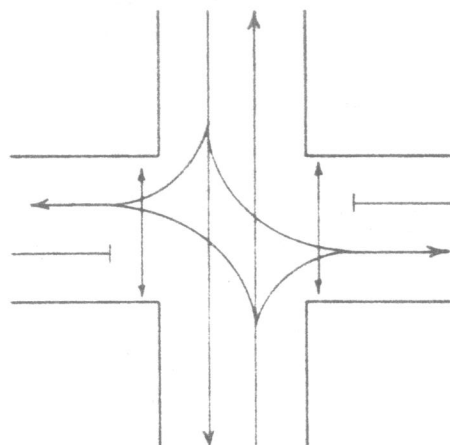
* "Z" Not less than 7 secs.

* "Y" Plus intervals 4 & 5 or 9 & 10 must equal required pedestrian clearance.

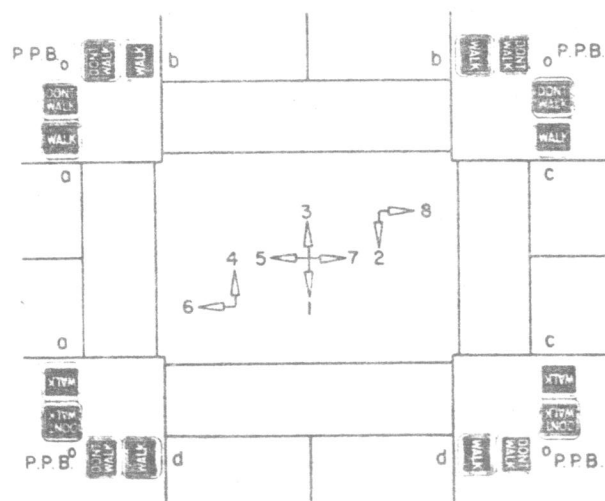
Added November 1970

Figure 20(c)

Pedestrian - Combined Interval Intersection of Two, Two-Way Streets (Full-Actuated Operation)



* Fl. W. - Flashing Walk.
D. W. - Don't Walk.
Fl. D. W. - Flashing Don't Walk.
P.P.B. - Pedestrian Push Button



Signals shown for
phasing identification only.

All
Signals



a-b-c-d



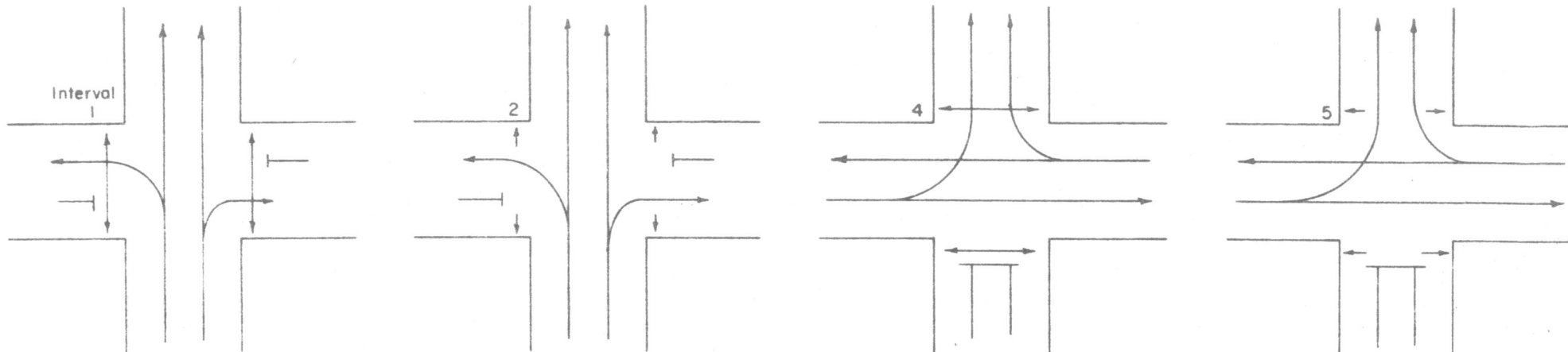
Signal	Phase A					Phase B					Flash
	1	2	3	4	5	6	7	8	9	10	
1-2	G	G	G	Y	R	R	R	R	R	R	Y
3-4	G	G	G	Y	R	R	R	R	R	R	Y
5-6	R	R	R	R	R	G	G	G	Y	R	R
7-8	R	R	R	R	R	G	G	G	Y	R	R
* a-c	Fl. W.	Fl. D. W.	D. W.	D. W.	D. W.	D. W.	D. W.	D. W.	D. W.	D. W.	
* b-d	D. W.	D. W.	D. W.	D. W.	D. W.	Fl. W.	Fl. D. W.	D. W.	D. W.	D. W.	
Ped.	"Z"	"Y"		3	2	"Z"	"Y"		3	2	
Fixed											
Initial	5					5					
Veh.	5					5					
	Max.					Max.					

"Z" Not less than 7 secs.

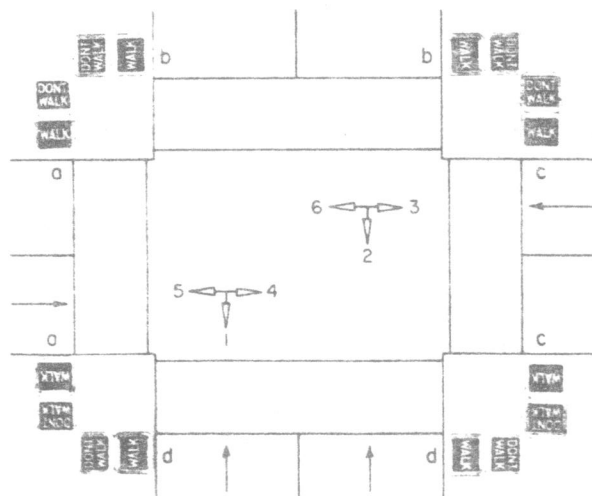
"Y" Plus intervals 4 & 5 or 9 & 10 must equal required pedestrian clearance

Figure 21(a)

Pedestrian Exclusive and Combined Interval One-Way Street Intersecting a Two-Way Street



** W - Walk
 Fl. W - Flashing Walk
 D. W. - Don't Walk
 Fl. D. W. - Flashing Don't Walk



Signals shown for
 phasing identification
 only

All Signals



a-b-c-d



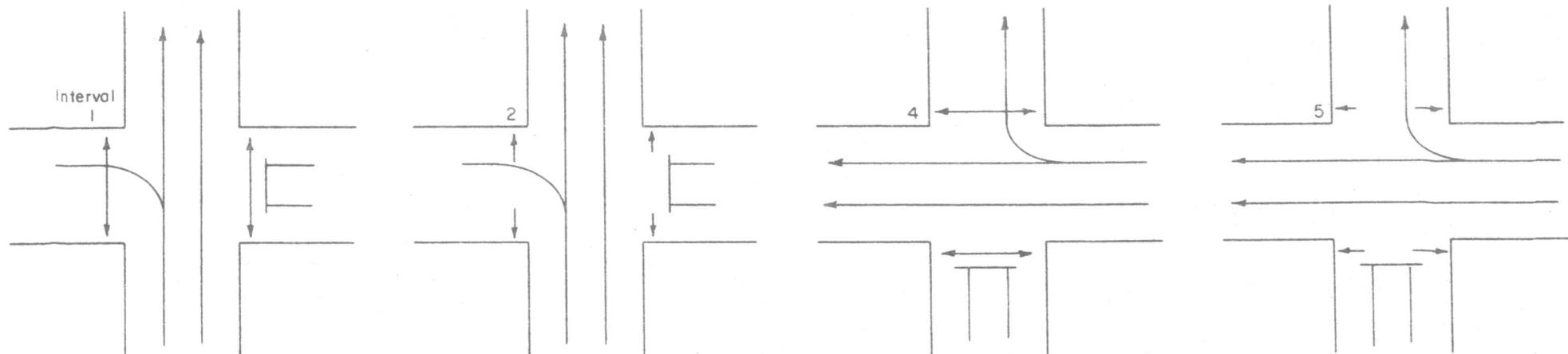
Signal	Phase A			Phase B				Flash
	1	2	3	4	5	6		
1-2	G	G	Y	R	R	R		Y
3-4	R	R	R	G	G	Y		R
5-6	R	R	R	G	G	Y		R
a	Fl. W	Fl. D. W	Fl. D. W	D	D	D		Off
b	D	W	D	W	W	Fl. D. W		Off
c	Fl. W	Fl. D. W	Fl. D. W	D	D	D		Off
d	D	W	D	W	W	Fl. D. W		Off
Time	27	*6	3	12	*9	3		60 Sec.
%Cycle	45	10	5	20	15	5		100%
Dial Setting	C	45	55	60	80	95		0

* Time for these intervals based on length of crosswalk.

⊗ May be Flashing or Steady Don't Walk.

Figure 21(b)

Pedestrian – Exclusive and Combined Interval Intersection of Two, One –Way Streets

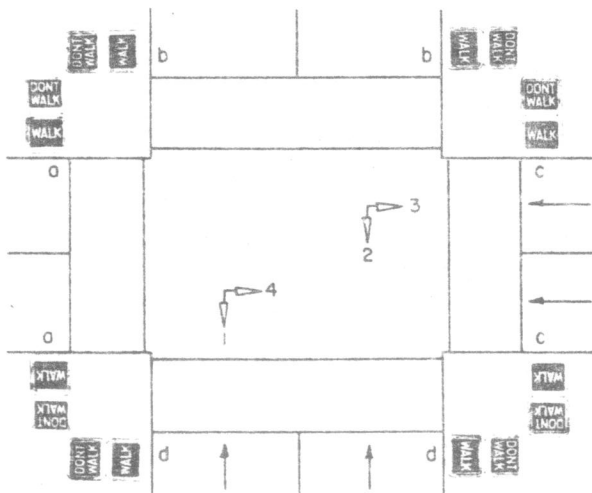


** W. – Walk

Fl. W. – Flashing Walk

D. W. – Don't Walk

Fl. D. W. – Flashing Don't Walk



Signals shown for
phasing identification
only.

All
Signals



a-b-c-d



Signal	Phase A			Phase B			
	1	2	3	4	5	6	Flash
1-2	G	G	Y	R	R	R	Y
3-4	R	R	R	G	G	Y	R
a	Fl. W.	Fl. D. W.	Fl. D. W.	D. W.	D. W.	D. W.	Off
b	D. W.	D. W.	D. W.	Fl. W.	Fl. D. W.	Fl. D. W.	Off
c	W.	Fl. D. W.	Fl. D. W.	D. W.	D. W.	D. W.	Off
d	D. W.	D. W.	D. W.	W.	Fl. D. W.	Fl. D. W.	Off
Time	27	*6	3	12	*9	3	60 Sec.
%Cycle	45	10	5	20	15	5	100%
Dial Setting	0	45	55	60	80	95	0

* Time for these intervals based on length of crosswalk

⊗ May be Flashing or Steady Don't Walk.

Added November 1970

HOURLY MOVEMENT CHART FOR PHASING AND TIMING OF TRAFFIC SIGNAL

Revision of Existing Installation

— A.M. and/or P.M. Peak Hour

New Installation At Existing Intersection

— A.M. and/or P.M. Peak Hour

New Intersection Created By Construction

— Design Hour Volume

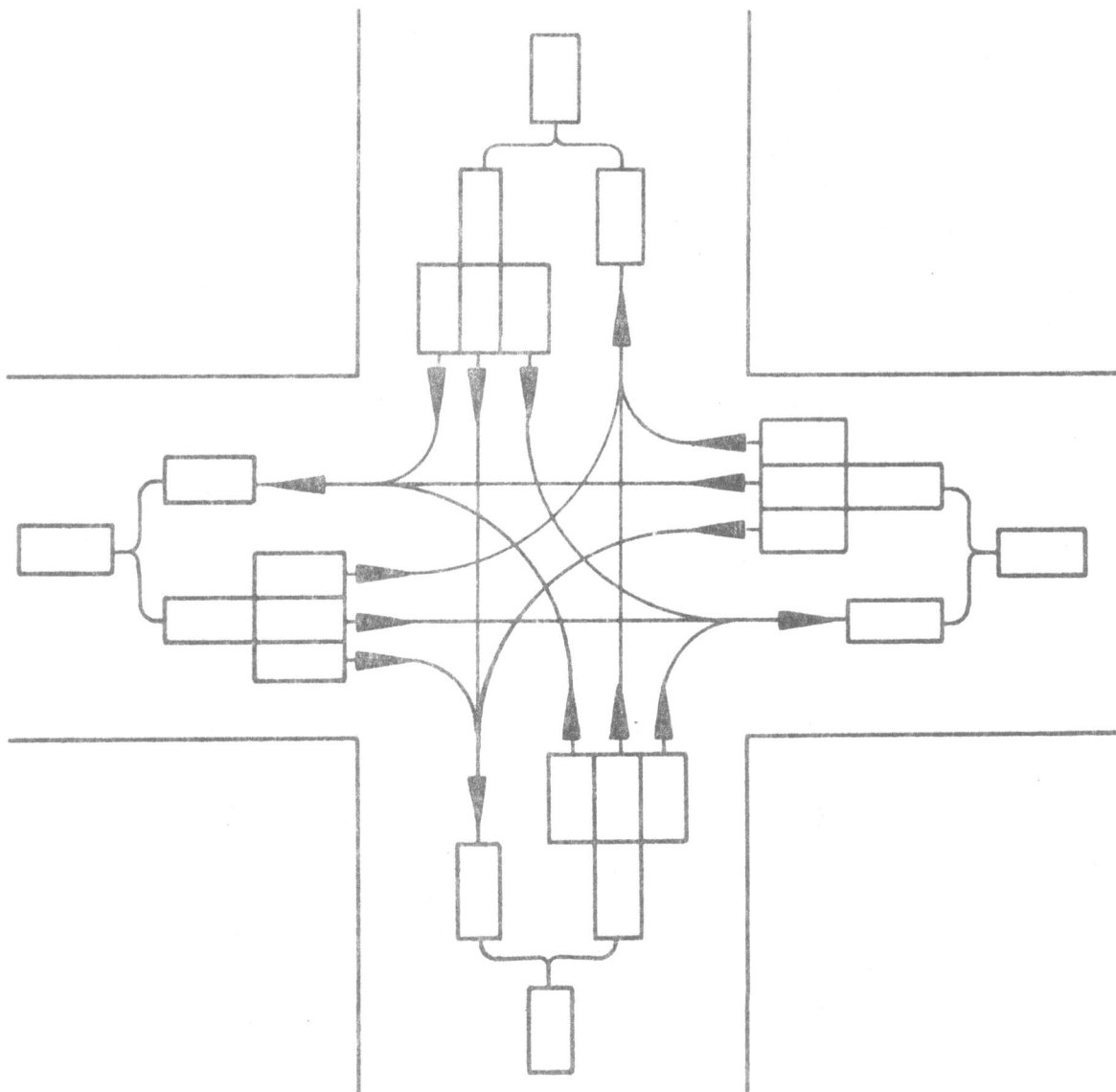


Figure 22

APPENDIX C

Information for District and Central Office Personnel

The following Figures indicate the material and data necessary for a traffic signal investigation and issuance of a permit.

Figure A	Letter of Transmittal (2 sheets)
B	Recorder Count Summary
C	Vehicular Volume Summary - Form 6128 (Manual Count as Specified in T-26)
D	Pedestrian Count Recap Sheet - Form 6128 (When Required)
E	Flow Diagram - Form 101 (or Variations of)
F	Evaluating Traffic Volumes (4 sheets)
G	Check List for Condition Diagram
H	Sample Condition Diagram
I	Notes for Condition Diagram with Movement Diagram and Color Sequence.
J	Railroad and Transit Grade Crossing Information
K	Collision Diagram (Two Samples either acceptable)
L	Form 952 Application.

COMMONWEALTH OF PENNSYLVANIA

(Date)

SUBJECT: County - Township, Borough or City
Intersection
Traffic Signals

TO: Mr. J. R. Doughty, Director
Bureau of Traffic Engineering

FROM: District Engineer
Engineering District

A summary of our traffic signal investigation for the subject intersection is as follows:

1. Vehicular traffic entering the intersection from both approaches on the major street and the highest volume minor street approach during the eighth matching hour is ____ vehicles per hour.
2. Vehicular traffic entering the intersection from both approaches on the major () Street during the eighth matching hour is ____ vehicles per hour. (Manual ____). There is (are) ____ lane(s) on each approach.
3. Vehicular traffic entering the intersection from one approach on the minor () Street during the eighth matching hour is ____ vehicles per hour. (Manual ____). There is (are) ____ lane(s) on each approach.
4. Pedestrians crossing the major street average ____ per hour for each of the eight highest hours of vehicular traffic.
5. An accident report (is) or (is not) attached. There are ____ reported accidents for the last three (3) years. ____ of these would have been susceptible to correction by traffic signals.
6. At the present time there are or are not traffic signals operating here.
7. () Street (is) or (is not) posted for a ____ speed limit. The average speed is ____ miles per hour.
() Street (is) or (is not) posted for a ____ speed limit. The average speed is ____ miles per hour. There (is) or (is not) any effort on the part of the local authorities to enforce the speed limit zone on () Street.
8. Left turns from the major street are ____ during the peak hour and ____ during the eighth matching hour.
9. General Information:
 - (a) This is a (business) or (residential) district in a (rural) or (urban) area.
 - (b) The width of the roads (do) or (do not) present difficulty for the pedestrian crossing here.
 - (c) There (is) or (is not) special movements of aged or afflicted people across the intersection

- (d) This (is) or (is not) a major school crossing. The children (are) or (are not) controlled by a school patrol or crossing guard.
- (e) If railroad grade crossing is nearby, give details pertaining to same.

Section 10. We discussed the matter of placing signals here with the proper local officials on (Date). The officials contacted were (Names). The following is a report of that meeting.

Section 11. We (recommend) or (do not recommend) the issuance of the requested permit, for (Type) signals, as shown on the accompanying condition diagram. This recommendation is based on (give pertinent comments on your recommendation).

District Traffic Engineer

Approved:

District Engineer _____

Date _____

If a permit is not recommended, an alternate solution of the problem should be given which we may suggest along with our letter of rejection.

The above is the general information that should be included in all reports. Additional comments and recommendations should be included where needed.

A meeting with local officials (Section 10) should be held regardless of the results of the study and a report of the discussion should be included in this section.

Attachments:

24 HOUR RECORDER COUNT SUMMARY

COUNTY _____

DATE _____

LOCATION _____

DATES COUNTED _____

I-HOUR STARTING AT	MAJOR STREET		MINOR STREET		INTER- SECTION TOTAL	MAJOR TOTAL & MINOR HIGHEST ONE-WAY	NOTES
	TRAFFIC FROM THE	STREET TOTAL	TRAFFIC FROM THE	STREET TOTAL			
12							
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
Noon 12							
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
TOTAL							

A.
M.

P.
M.

Department of Highways

Bureau of Traffic

VEHICLE VOLUME

SUMMARY SHEET

County _____

Municipality _____

[illegible]

County _____

Date _____ Day of Week _____ Weather _____ Computer _____

Time		Maximum Hour Crossing	All Cross Walks
------	--	-----------------------	-----------------

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF HIGHWAYS
TRAFFIC DIVISION
FLOW DIAGRAM

L.R. _____ T.R. _____ St. _____ County _____

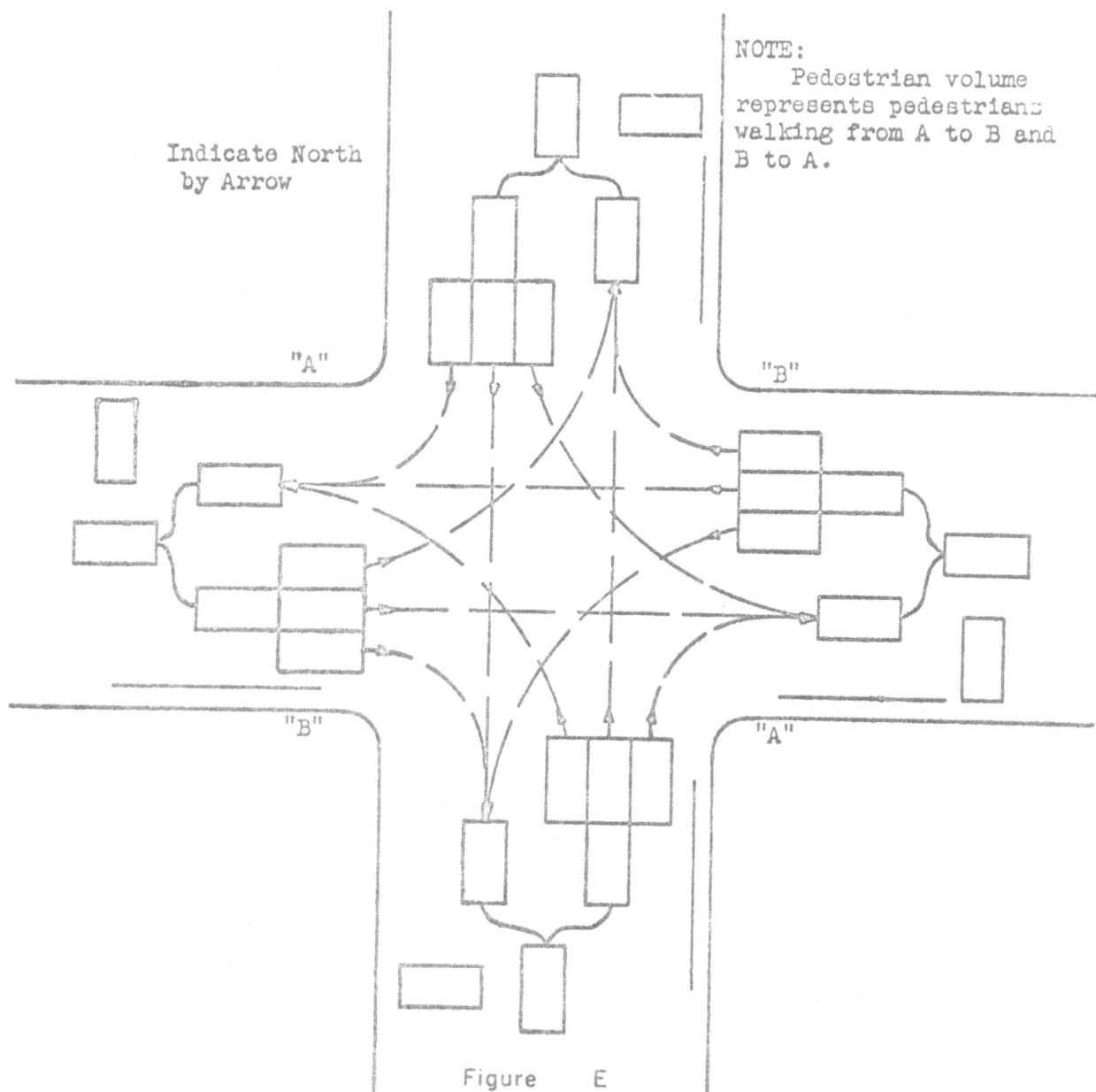
L.R. _____ T.R. _____ St. _____ Twp. City _____
Borough _____

Date _____ Day of Week _____ Weather _____

Period Shown From _____ M. _____ M. Total vehicles _____

Drawn By _____ Total pedestrians _____

Remarks _____



COMMONWEALTH OF PENNSYLVANIA
Department of Highways
Harrisburg

Subject: Evaluating Traffic Volumes
Traffic Volume Warrants

November 14, 1968

To: District Engineer, Dist. 1
District Engineer, Dist. 2
District Engineer, Dist. 3
District Engineer, Dist. 4
District Engineer, Dist. 5
District Engineer, Dist. 6
District Engineer, Dist. 8
District Engineer, Dist. 9
District Engineer, Dist. 10
District Engineer, Dist. 11
District Engineer, Dist. 12

From: J. R. Doughty, Director
Bureau of Traffic Engineering *AKS*

At the last traffic signal school held in Harrisburg Mr. John Geisel of the Central Office presented a session concerning the evaluation of traffic volumes in order to determine if the volume warrants were met for the installation of a traffic signal.

It is our recommendation that the volume of traffic entering the intersection from the higher volume minor street approach be used as the controlling factor in determining the high ten or more hours and that this traffic volume then be compared with the volume on the major street during THE SAME HOUR. Always compare the minor street volume with the volume on the major street for the same hour.

Attached you will find two examples of the above for an urban area with one travel lane in each direction on both streets. You will note that the "Top Ten Hours" have been selected on the basis of the traffic volume on the higher hourly volume minor street approach. In this example, the volume for each of the first eight hours on the higher volume approach of the minor street and the corresponding hourly volume on the major street exceeds the required minimum volume warrant; therefore, a traffic signal is warranted.

In example two, the "Top Ten Hours" have been selected as above. You will note that the traffic volume for each of the first seven hours on both streets equal or exceed the required minimum volume warrants but the volume on the major street for

cc:

- more -

Dist. Traffic Engr., Dist. 1
Dist. Traffic Engr., Dist. 2
Dist. Traffic Engr., Dist. 3
Dist. Traffic Engr., Dist. 4
Dist. Traffic Engr., Dist. 5
Dist. Traffic Engr., Dist. 6

Dist. Traffic Engr., Dist. 8
Dist. Traffic Engr., Dist. 9
Dist. Traffic Engr., Dist. 10
Dist. Traffic Engr., Dist. 11
Dist. Traffic Engr., Dist. 12

COMMONWEALTH OF PENNSYLVANIA
Department of Highways
Harrisburg

Subject: Evaluating Traffic Volumes
Traffic Volume Warrants

November 14, 1968

To: District Engineer, Dist. 1
District Engineer, Dist. 2
District Engineer, Dist. 3
District Engineer, Dist. 4
District Engineer, Dist. 5
District Engineer, Dist. 6

District Engineer, Dist. 8
District Engineer, Dist. 9
District Engineer, Dist. 10
District Engineer, Dist. 11
District Engineer, Dist. 12

From: J. R. Doughty, Director
Bureau of Traffic Engineering

the eighth hour is less than the required minimum volume; however, the volume on both the minor street approach and the major street for the ninth hour equals or exceeds the minimum required volume. Therefore, eight hours meet or exceed the volume warrants and a traffic signal is warranted.

There may be instances when more than the "Top Ten Hours" will have to be selected in order to determine if the required volume warrants are met; however, these cases are not common. A guide for this would be to look at the volumes on the major street and determine which volume warrant should be used and then select the hours where the volume on the higher volume minor street approach equals or exceeds the minimum required volume for the specific warrant.

450/AKS/elh

cc: H. S. Pomroy

Dist. Traffic Engr., Dist. 1
Dist. Traffic Engr., Dist. 2
Dist. Traffic Engr., Dist. 3
Dist. Traffic Engr., Dist. 4
Dist. Traffic Engr., Dist. 5
Dist. Traffic Engr., Dist. 6

J. W. Geisel

Dist. Traffic Engr., Dist. 8
Dist. Traffic Engr., Dist. 9
Dist. Traffic Engr., Dist. 10
Dist. Traffic Engr., Dist. 11
Dist. Traffic Engr., Dist. 12

24 HOUR RECORDER COUNT SUMMARY

COUNTY _____

DATE _____

LOCATION URBAN 1 LANE

DATES COUNTED _____

A.
M.

P.
M.

I-HOUR STARTING AT	MAJOR STREET			MINOR STREET			INTER- SECTION TOTAL	MAJOR TOTAL & MINOR HIGHEST ONE-WAY	NOTES
	TRAFFIC THE	FROM	STREET TOTAL	TRAFFIC THE	FROM	STREET TOTAL			
12									
1									
2									
3									
4									
5									
6									
7			610	175	210 ⁽²⁾		610	210	
8			630	220 ⁽¹⁾	212		630	220	
9			580	165	180 ⁽⁵⁾		580	180	
10									
11									
Noon 12			520	175 ⁽⁶⁾	140		520	175	
1			530	170 ⁽⁷⁾	142		530	170	
2			490	136	150 ⁽⁹⁾		490	150	
3									
4									
5			590	135	190 ⁽⁴⁾		590	190	
6			600	200 ⁽³⁾	185		600	200	
7			510	155	160 ⁽⁸⁾		510	160	
8			390	110	130 ⁽¹⁰⁾		390	130	
9									
10	Note: Always compare Minor Street volumes with volumes on the Major Street AT THE SAME HOUR (ie 160 at 7 P.M. with 510 on Major.)								
11									
TOTAL									

Signal Warranted
8th highest hour
160 min. warrant
150 " " " " " " " "

24 HOUR RECORDER COUNT SUMMARY

COUNTY _____

DATE _____

LOCATION URBAN 1 LANE

DATES COUNTED _____

I-HOUR STARTING AT	MAJOR STREET			MINOR STREET			TOP TEN HOURS		NOTES
	TRAFFIC THE	FROM	STREET TOTAL	TRAFFIC THE	FROM	STREET TOTAL	MAJOR TOTAL	MINOR HIGHEST ONE-WAY	
12									
1									
2									
3									
4									
5									
6									
7			610	175	210 ⁽²⁾		610	210 ⁽²⁾	
8			630	220 ⁽¹⁾	212		630	220 ⁽¹⁾	
9			580	165	180 ⁽⁵⁾		580	180	
10									
11									
Noon									
12			520	175 ⁽⁶⁾	140		520	175	
1			530	170 ⁽⁷⁾	142		530	170	
2			510	136	150 ⁽⁹⁾		510	150	
3									
4									
5			590	135	190 ⁽⁴⁾		590	190 ⁽⁴⁾	
6			600	200 ⁽³⁾	185		600	200 ⁽³⁾	
7			480	155	160 ⁽⁸⁾		480	160	
8			390	110	130 ⁽¹⁰⁾		390	130	
9									
10									
11									
TOTAL									

A.
M.

P.
M.

1st 7 hours above min. warrant
8th hour below on major street
However, 9th hour on minor 8th hour major exceeds warrant.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF HIGHWAYS
BUREAU OF TRAFFIC ENGINEERING
TRAFFIC SIGNALS SECTION
CHECK LIST FOR CONDITION DIAGRAM

1. Plan of intersection extending 150 ft. on each approach. Scale 1" = 20 ft. or 1" = 25 ft. Show street names, legislative route numbers, if any. Maximum size of plan shall be 22" by 17" (additional sheets may be used if necessary).
2. Show north arrow.
3. Show pavement, lane and shoulder widths, all pavement markings, right-of-way and property lines, approximate grades, drainage pipes and inlets, curbing radii (curbed or uncurbed, driveways and barriers).
4. Show utility poles, street lighting, traffic islands, traffic signal poles, vehicular detectors, signal heads and controller, if any.
5. Locate no parking and restricted parking zones, hours etc., bus stops, and direction of one-way streets, if any. Show all traffic control signs and the speed limits on each approach.
6. Show existing buildings and locate any obstruction to sight distance for the driver approaching the intersection. This will include trees, shrubbery, fences, billboards, walls, etc.
7. Show location of any railroad or rail transit grade crossings within 300 feet of the intersection. Give name of the railroad or transit company, indicate existing protection and whether siding, mainline, etc.
8. Indicate distance to nearest existing traffic signal on each approach, if one mile or less. Show municipal boundaries, if within the area of the plan and identify the municipality.
9. A reproducible tracing or transparency of the Condition Diagram is to be submitted with the application for a traffic signal permit. Tracings on transparencies shall never be folded, they shall be rolled and mailed in mailing tube.

The following information shall be placed on the condition diagram by the District Traffic Engineering Unit conducting the Traffic Signal Investigation.

1. Legislative route number, if not shown, and station number for centerlines of each approach.
2. All proposed pavement markings, including cross walks, stop lines, words, symbols center and lanelines.
3. All proposed traffic signals and detectors.

4. All necessary signs for proper operation and control of the proposed signalized intersection. Decals should be used for sign and signal illustrations whenever possible.
5. The numerical designation of any signals having the same color sequence should be combined on one line of the Color Sequence and Movement Chart.
6. If traffic signals are not present within a mile, on any approach, so indicate on the condition diagram.
7. Hourly movement charts (see figure 22) for phasing and timing of Traffic Signals shall be placed on, or attached to, the condition diagram.

Installation, operation and maintenance of these signals shall be in accordance with Pennsylvania Department of Highways Regulations governing the design, location and operation of signs, signals and markings.

Placing and maintaining of the limit lines is the responsibility of the municipality and shall be kept in an effective condition at all times.

No modifications of this installation are permitted unless prior approval is granted, in writing, by the Secretary of Highways.

Post mounted signals shall be installed with the signal heads a minimum of 2' (feet) behind the face of the curb or edge of the shoulder.

The minimum horizontal distance between signals, measured at right angles to the approach, shall be 8' (feet).

Number of Prints Required

1 additional for each additional Municipality

crossing is involved.

[illegible]

PENNSYLVANIA DEPARTMENT OF HIGHWAYS	
BUREAU OF TRAFFIC ENGINEERING	
County	
Municipality	
Drawn By	DATE
Approved	DATE
Scale	

Frank C. Williams

RAILROAD GRADE CROSSING INFORMATION

When there are railroad or transit crossings at grade within 300 feet of the intersection, in any direction, the following information shall be submitted for any traffic signal request.

1. The Name(s) of the Railroad or others using the crossing.
2. The Type of Crossing (freight, shifting, spur, etc.).
3. The number of crossings per day.
4. The approximate time of crossing(s), or number per hour in case of a Trolley crossing.
5. The average length of time it takes the train to clear the area of the intersection.
6. The Type of crossing protection presently in use.

(If Flashers, Gates, Bells or combinations of these are present, determine the time element (maximum - minimum) that they are in operation prior to the time a train or transit vehicle reaches the crossing. Example, fast train v.s. slow train, transit vehicle with a stop before reaching the crossing v.s. no stop).
7. The Speed Limit of the train over the crossing.
8. The Number and Position of the tracks should be shown on the condition diagram.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF HIGHWAYS
Traffic Bureau

COLLISION DIAGRAM

Date _____

Location _____

Drawn by _____

Indicate North
by Arrow

Scale _____

Indicate For Each Accident.

Date

Time of Day

(Dark - D or Light - L)

Surface Condition

(Dry - Wet - Ice - Snow)

Property Damage - (P.D.)

Number Injured and/or Killed

LEGEND

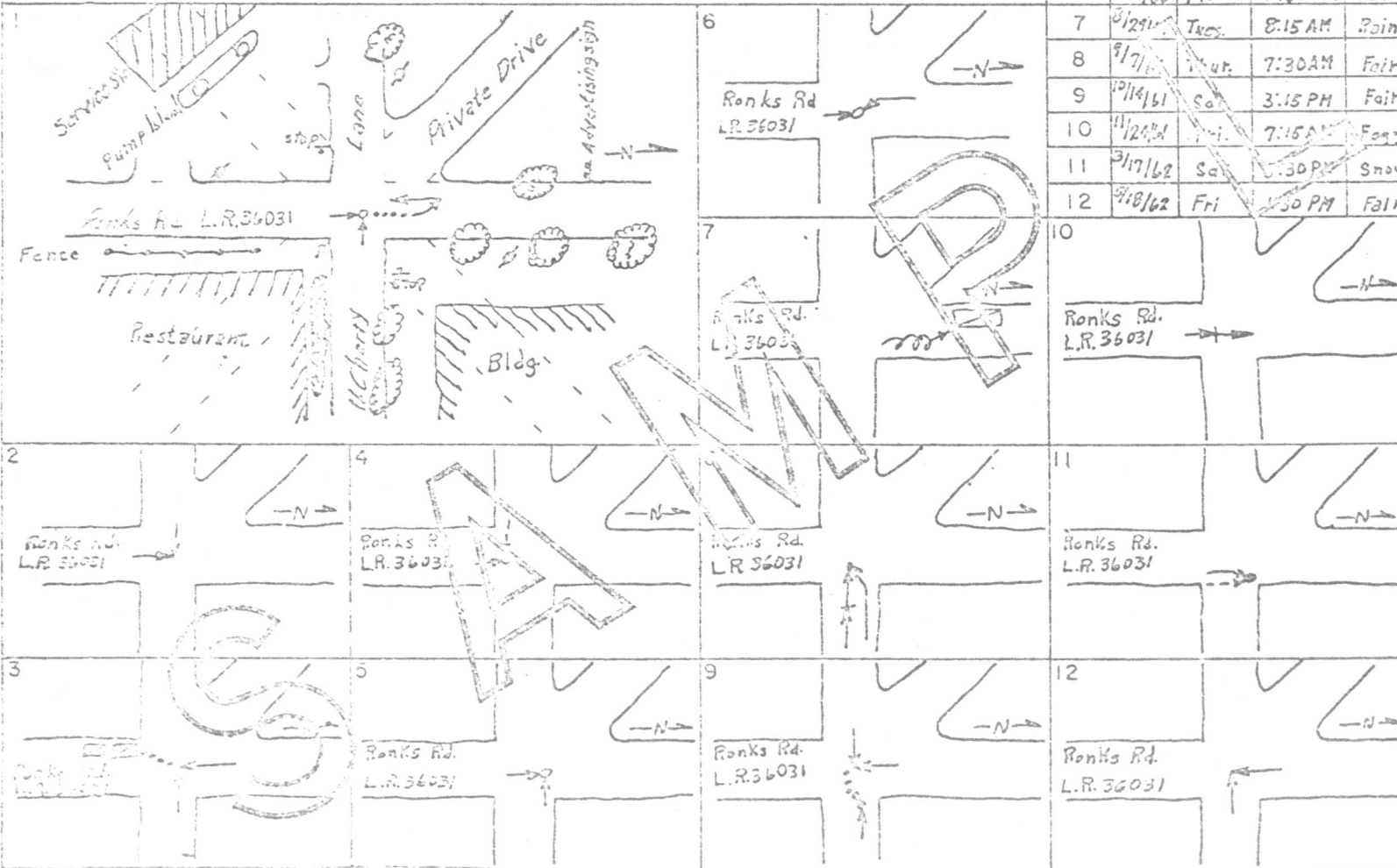
- ←--- Path of Pedestrian
- ←○ Path of Bicycle
- ←○ Path of Motorcycle
- ←× Path of Wagon
- ← Path of Automobile
- ← Path of Street Car
- Path of Fatal Accident
- Path of Personal Injury Accident
- Path of Property Damage Only
- ←+ Path of Rear End Collision
- Path of Car Overturned
- Path of Skidding
- ⊠ Vehicle Stopped in Roadway
- ⊠ Parked Vehicle

ACCIDENT REPORT

COUNTY Lancaster GORO, CITY, TOWNSHIP East Lampeter

INTERSECTION Ronks Rd. L.R. 36031 ALL REPORTED ACCIDENTS FROM 7/1/59 TO 6/30/62
Cherry Lane DATE DATE

NOTE: SKETCH NO. 1 SHOULD INCLUDE PERTINENT INFORMATION CONCERNING THE INTERSECTION, STREET NAMES, TRAFFIC SIGNS, PHYSICAL OBSTRUCTION, BUILDINGS, NORTH DIRECTION ARROW, DRIVEWAYS ETC. REMAINING DIAGRAMS SHOULD INCLUDE OUTLINE OF INTERSECTION, ONE STREET NAME, NORTH DIRECTION ARROW ONLY.



REPORT NO.	DATE	DAY	TIME	WEATHER	ROAD CONDITION	NO. KILLED	NO. INJURED	PROP. DAMAGE
1	0/20/59	Mon.	6:15 PM	Clear	Dry	0	2	\$1050
2	10/22/59	Thurs.	6:10 PM	Fair	Dry	0	2	\$1500
3	12/15/59	Sat.	10:00 AM	Fair	Dry	0	1	\$1800
4	1/10/60	Sun.	9:00 PM	Snow	Wet	1	1	\$750
5	1/23/60	Mon.	4:15 PM	Fair	Dry	0	1	\$500
6	10/14/60	Fri.	5:30 PM	Fair	Dry	0	1	Neg.
7	8/29/61	Tues.	8:15 AM	Rain	Wet	1	1	\$600
8	9/17/61	Thurs.	7:30 AM	Fair	Dry	0	0	\$100
9	10/14/61	Sat.	3:15 PM	Fair	Dry	1	3	\$1400
10	11/24/61	Mon.	7:15 AM	Foggy	Wet	0	2	\$650
11	3/17/62	Sat.	5:30 PM	Snow	Wet	2	3	\$2845
12	9/18/62	Fri.	1:30 PM	Fair	Dry	0	0	\$100

LEGEND

← → VEHICLE BACKING	▢ BUILDING
← - MOTOR VEHICLE	⊙ TREE or BUSH
← PEDESTRIAN	⊙ POLE
▢ PARKED VEHICLE	⊙ FACE of SIGN
▢ PARKING or UNPARKING	⊙ SHRUB - HEDGE
▢ FIXED OBJECT	

ACCIDENT TYPES

← → - REAR END	↔ SIDE SWIPE
↔ HEAD-ON	↔ BACKING
↔ RIGHT ANGLE	↔ OUT OF CONTROL
↔ LEFT TURN	↔ SKIDDING
..... MOVEMENT AFTER IMPACT	

ACCIDENT RESULTS (USING HEAD-ON SYMBOLS)

↔ - INJURY	↔ - FATAL
↔ - PROPERTY DAMAGE	

4/30/64

APPLICATION FOR PERMIT
TO INSTALL AND OPERATE
TRAFFIC SIGNALS

DATE _____

WHEREAS, the _____, _____ County,
(CITY, TOWNSHIP, BOROUGH)

desires to erect, operate and maintain traffic signals at the intersection of _____, and

WHEREAS, The Vehicle Code requires the approval of the Secretary of Highways before any traffic signals may be legally erected or reconstructed, and

WHEREAS, the Department of Highways requires an engineering drawing of this intersection, the _____ will prepare such a drawing in conformance with the instructions provided by the Department.

NOW, THEREFORE, BE IT RESOLVED, that traffic signals be erected at the above mentioned location, subject to the approval of the Secretary of Highways, and that his approval is hereby requested, and

BE IT FURTHER RESOLVED, that, in the event a traffic signal permit is approved after proper investigation by the Secretary of Highways or his agent, the _____ will be bound by the following provisions:

The installation shall be made in accordance with the requirements of the Vehicle Code and the Manual of Regulations for Official Traffic Signs and Signals of this Commonwealth, and

Should future highway or traffic conditions, or legal requirements, necessitate alterations of the construction or operation, or hours of operation, or removal of the traffic signals at the above mentioned intersection, they shall be altered or removed when and as directed by the Secretary of Highways.

I, _____, Secretary of the _____ do certify that the foregoing is a true and correct copy of the resolution legally adopted at the meeting held, _____ (DATE)

(SEAL)

Signed _____ SECRETARY