



Specification of Vehicle Group Operation

Guidelines for Developing



Roads and Traffic Authority

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Revision history

Version	Date	Details

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Contents

1	Introduction	5
1.1	Definitions and abbreviations.....	5
1.2	References.....	6
1.3	Associated Documents.....	6
2	Design Steps.....	7
3	Vehicle Group Table Specification	8
3.1	Late Start Specification	9
3.2	Pedestrian Protection	9
4	Vehicle Group Operation	13
4.1	Filter Phase.....	13
4.2	Overlap	13
5	Standard Table Format	14
5.1	Structure.....	14
5.2	Definitions and Abbreviations.....	14
5.3	SCATS Signal Pulses	15
6	Standard Table Selection Charts.....	16
6.1	Main Selection Chart	16
6.2	Left Turn Selection Chart – Sheet 1	17
6.3	Left Turn Selection Chart – Sheet 1-1	18
6.4	Left Turn Selection Chart – Sheet 1-2	18
6.5	Left Turn Selection Chart – Sheet 1-2-1	19
6.6	Left Turn Selection Chart – Sheet 1-3	20
6.7	Left Turn Selection Chart – Sheet 1-3-1	20
6.8	Left Turn Selection Chart – Sheet 1-4	21
6.9	Left Turn Selection Chart – Sheet 1-5	21
6.10	Right Turn Selection Chart – Sheet 2.....	22
6.11	Right Turn Selection Chart – Sheet 2-1	23
6.12	Right Turn Selection Chart – Sheet 2-2.....	23
6.13	Right Turn Selection Chart – Sheet 2-2-1	24
6.14	Right Turn Selection Chart – Sheet 2-3.....	24
6.15	Main Signal Selection Chart – Sheet 3	25
6.16	Main Signal Selection Chart – Sheet 3-1.....	26
7	Standard Table Selection Guides	27
7.1	Selection Guide for Main Signals	27
7.2	Selection Guide for Right Turn Arrows.....	27
7.3	Left Turn Arrows	28

Table of Figures

Figure 1: Illustration of transverse and parallel (direct and side) pedestrian conflict for a left turn.....	10
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I Introduction

This document provides a description of the method to be adopted in specifying the colour sequences for a vehicle group for all possible phase sequences and conditions applying to the group. It replaces the Standard for Signal Group Displays [4].

A table technique has been developed and is briefly described below.

In the first instance consideration is given to the intersection as a whole to determine the constraints placed on each vehicle group by other signal groups and movements at the intersection. The factors which must be considered are:

- (a) direct conflict of movements,
- (b) absence/presence of a conflicting filter movement,
- (c) whether a movement utilises a traffic lane which is shared with another movement, e.g. a lane may be shared by through traffic and left turn traffic,
- (d) absence/presence of a pedestrian conflict,
- (e) the degree of protection required for pedestrian conflicts.

The colour sequences for each vehicle group are then specified for each set of considerations for the phases of the intersection. The selection guides, section 6, are simply flowcharts leading to a particular table given the answers to the factors (b) – (e) above.

To specify a vehicle group merely requires the answers to (b) – (e) to be provided on the design plan. The standard tables associated with this document specify the actual colour sequences for the vehicle groups. The technique handles all intersections by answers to the same questions. The tables are analogous to those presented in this document. A specific exception is the case of single and double diamond overlap designs, for which separate standards already exist, TS-TN-026 [14] and TS-TN-027 [15].

I.1 Definitions and abbreviations

Term	Meaning
EPD	Example Personality Data
GRN	Green
Intergreen	A term used to collectively refer to the following intervals: Early Cut Off, Yellow and All red. Also referred to as the “clearance” part of the running phase.
LM	Library Macro
L.T.	Left Turn
LTOR	Left Turn On Red
OD	Operational Description
Overlap	Where a vehicle group displays green during the intergreen
RA	Red Arrow
R.T.	Right Turn
RTA	Roads and Traffic Authority
TAE	Typical Application Example
TMB	Traffic Management Branch
W&CL	Walk and Clearance

1.2 References

- [1] VD018-10, Standard for Detector Specification Schedule, 23 December 1988 (*also titled Standard Tables for Detector Logic, RTA Standard Personality, 24 November 1988*)
- [2] VD018-5, Standard for Single Diamond Overlap Design
- [3] VD018-6, Standard for Double Diamond Overlap Design
- [4] VD018-8, Standard for Signal Group Displays
- [5] VD018-14, Standard for Single Diamond Overlap Phasing with Filter Option
- [6] TS-QA-156, Personality Standard Tables Management – Standard Operating Procedure
- [7] Traffic Signals Practice, Design – RTA, February 2008
- [8] RTA-TC-106, Traffic Signal Operation, Version 1.1, October 2000
- [9] Australian Road Rules, 19 October 1999

1.3 Associated Documents

- [10] TS-TN-020, Specification of Detector Logic Operation – Guidelines for Developing
- [11] TS-TN-021, Specification of Pedestrian Movement Operation – Guidelines for Developing
- [12] TS-TN-022, Specification of Ancillary Operation – Guidelines for Developing
- [13] TS-TN-023, Layout of Macros for Standard Tables – Guidelines
- [14] TS-TN-026, Standard for Single Diamond Overlap Phasing
- [15] TS-TN-027, Standard for Double Diamond Overlap Phasing
- [16] RTA_TC-185, RTA Standard Personality Reference Manual (Phases)

2 Design Steps

The complete process for developing an intersection design correctly is given in Traffic Signals Practice, Design, [7] and briefly outlined below.

1. Prepare a sketch of the intersection including lane markings, pedestrian crossings and detector locations. Make sure to distinguish between shared and exclusive lanes.
2. Prepare a sketch of the movements permitted in each phase (one sketch per phase) with arrows indicating the direction of movement.
3. Add the primary lanterns for each vehicle group to the sketch.
4. Add group labelling to the lanterns in accordance with Traffic Signals Practice, Design, [7].
5. Determine what vehicle groups are required.

All vehicle groups should be listed in a signal group/phase chart on the design plan. The chart should provide for each identified signal group:

- an indication of when it is green, or conditionally green, during each phase;
- the appropriate table type, as determined from the relevant flowcharts in section 6; and
- any particular remarks, eg the degree of pedestrian protection.

The operation of all pedestrian groups should also be described by entries in the table.

For example:

Signal Group	A	B	C	D	Table Type (from Selection Guide)	Remarks
V2		X	X		3	
V3	C	X			5	No red arrow protection for P1 pedestrian
V5		X	C		14	Timed red arrow protection for P3 pedestrian
P2	X				Ped	(i) Introduction concurrent with (ii) Timer terminated except under masterlink

The methodology is fully explained in Traffic Signals Practice, [7].

3 Vehicle Group Table Specification

The following table technique is used as a means of specifying all possible vehicle group colour changes/sequences in a manner suitable for direct translation into the colour tables in the controller personality.

The explanation of the technique is with reference to the table in the figure below.

①	②	③	④	⑤
INA	RED	TOB	RED, GREEN IN B	
		TOC	NO 'C' PED DEMAND	RED, OFF IN C
			'C' PED DEMAND	RED, RED FOR WALK & CLEARANCE IN C

The example above specifies the colour sequences for a vehicle group at a 3 phase intersection during 'A' phase.

Column ① specifies the running phase under consideration, that is, the phase which the controller is considered to be 'IN'. Thus INA, INB or INC in this first column specifies the running phase to be A, B or C respectively.

Column ② specifies the colour for the vehicle group for the LATE START to EXTENSION (REST) intervals for the running phase specified in column 1. In the example, the colour specified is RED. It should be noted that the vehicle group colour may change in the LATE START to EXTENSION intervals, as for example would be the case for a red arrow protecting a pedestrian WALK. In such a case the conditions and the colours are specified in column 2 to fully describe the colour changes in the LATE START to EXTENSION intervals. There are 2 types of situation where the colour may change during the LATE START to EXTENSION intervals. The first is where the display of the "normal" phase colour is delayed until the LATE START interval has finished, section 3.1 below provides further information. The second situation follows where a pedestrian demand in the phase causes a RED to be displayed to protect a pedestrian movement; section 3.2 below provides further information.

Column ③ specifies the phase to follow the running phase, (i.e. the phase in column 1). Clearly there must be entries in this column for all other phases to allow the vehicle group colour changes to be fully specified. The technique provides a set of rows, one for each phase which may follow the running phase. Note that the controller cannot leave the EXTENSION (REST) interval on the running phase until the next phase to follow has been determined, and that once the next phase has been established it cannot be changed. Thus the boundary between columns 2 and 3 is a decision point regarding which phase is to follow.

The remaining columns (④ and ⑤) specify the colour sequences for the vehicle group in the intergreen part of the running phase, that is, the EARLY CUT OFF GREEN to ALL RED intervals. A colour must be specified for each of these intervals for the particular phase change to fully specify the colour sequence for the vehicle group. Thus colours must be specified for the intervals ECO GREEN, YELLOW and ALL RED. A convention has been adopted to avoid redundant repetition in specifying the colours for these intervals, as follows:

- (a) If no ECO GREEN interval applies, then no colour is specified. Further, it is implicitly assumed that the colour for the ECO GREEN interval is the same as for the EXTENSION (REST) interval in the event that a non-zero time is specified unless specifically noted to the contrary. For most cases no colour would need to be specified.
- (b) If the same colour applies for the YELLOW and ALL RED intervals, then a single colour only is specified which is interpreted as applying to both intervals.

Further to the colours for the ECO GREEN to ALL RED intervals, the colour at the commencement of the new phase is also specified.

Considering the first row in the example, it is seen that vehicle group colour is RED in A phase, and remains RED in the ECO GREEN to ALL RED intervals when 'B' phase is the next phase, and then becomes GREEN at the commencement of 'B' phase.

There may be other conditions affecting the colour sequence for a particular change in phase, such as whether a pedestrian movement will be introduced in the following phase. The extra conditions are catered for by providing an additional column (or columns) in the table, and adding as many rows as necessary to cover all combinations of conditions. The example illustrates this for the transition from A phase to C phase. It is seen that the vehicle group remains RED in the ECO GREEN to ALL RED intervals in each case, however the vehicle display becomes OFF in 'C' phase when the 'C' pedestrian was not called, and remains RED for WALK and CLEARANCE in 'C' phase when the 'C' pedestrian was called.

3.1 Late Start Specification

The late start protection is generally provided to allow late/slow moving vehicles to clear the path of the vehicles being held by the delay in displaying the "normal" phase colour.

INB	CONDITIONAL RED IN LATE START	TOA	GREEN, GREEN IN A
	GREEN	TOC	YELLOW, RED, RED IN C

This colour change at the end of LATE START does not cause any differences to the subsequent colour sequences from the running phase to the next phase.

3.2 Pedestrian Protection

When a vehicle movement conflicts with a pedestrian movement, it may be necessary to provide protection for the pedestrians by displaying a red aspect (usually an arrow aspect). The degree of protection depends on the conflict. There are five levels of protection:

- no protection,
- protection timed during the walk interval,
- protection for the walk interval (not generally used on its own),
- protection timed during the walk and clearance intervals, though protection is provided for the whole of the walk interval as a minimum,
- full protection for the whole of the walk and clearance intervals.

In the cases for timed protection a time setting is required/ provided. Care is required when allocating a time setting to allow for regular use by slow/ incapacitated pedestrians.

The format and interpretation of the specification table for a vehicle group protecting a pedestrian movement is given in sections 3.2.2 and 3.2.3 below.

At certain intersections and for particular cases the removal of the red aspect may not mean a green aspect is given. Rather the red aspect is replaced by an off display to allow vehicles to filter subject to the driver taking care for pedestrians still using the crossing.

Full pedestrian protection is required under many situations and these are given in Traffic Signals Practice, Design, [7].

There are two types of pedestrian movement which may conflict with the vehicle movement; these are referred to in the standard tables as transverse and parallel, but are also known as direct and side conflicting pedestrian movements. Where no distinction is made as to the type of conflicting pedestrian movement the conflicting movement is a parallel (side) pedestrian movement. Figure 1 below illustrates the situation:

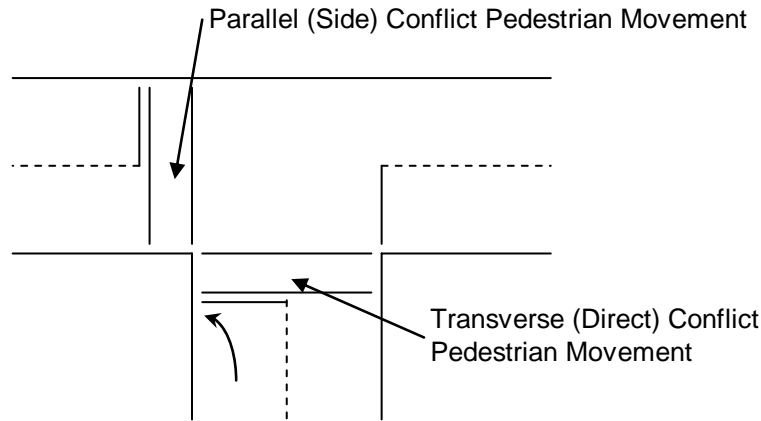


Figure 1: Illustration of transverse and parallel (direct and side) pedestrian conflict for a left turn

The specification of the pedestrian protection may come in two parts the first is the specification schedule and the second part may be the addition of a time setting.

3.2.1 Pedestrian Overlap

A pedestrian movement may overlap from one phase to the next. This determination is dependent on the following aspects.

- Whether the pedestrian movement is permitted in both phases.
- The choice of pedestrian movement table chosen, see Specification of Pedestrian Movement Operation [11].

Depending on the above aspects the controller may allow a phase to terminate while a pedestrian movement is still running. The vehicle group will continue to protect the pedestrian movement in the way specified in the vehicle group table.

3.2.2 Full Protection

The vehicle group specification table for where full protection is provided will be similar to the following.

INA	CONDITIONAL RED FOR W&CL	TOB	RED FOR W&CL, GREEN AT END W&CL, GREEN IN B
		TOC	RED, GREEN IN C
		TOD	RED, RED IN D
	OFF	TOB	GREEN, GREEN IN B
		TOC	OFF, GREEN IN C
		TOD	OFF, RED, RED IN D

It is not always possible to know the length of time a pedestrian movement is protected compared to the length of the phase. In certain situations it is possible for the pedestrian movement to overlap to the next phase while the first phase is terminated. In the case where the pedestrian movement cannot overlap to the next phase, the pedestrian movement must complete before the phase can end, ie all the pedestrian movement intervals (walk 1, walk 2, clearance 1 and clearance 2) must have completed. In addition, the clearance 1 interval must have completed before the phase termination point (ie the start of ECG).

There are two ways in which the vehicle group can transition to the next phase. They are given in the right side of the upper and lower halves of the INA table above. To better explain the way in which the vehicle group operates the following explanation is provided.

The lower half transitions are used when:

- The pedestrian movement is not demanded. In the LATE START to EXTENSION intervals the lower half of INA is active. In this case the vehicle group is OFF and the transitions to the next phase are as given in the lower half of INA.

- The pedestrian movement is demanded and completes prior to the phase termination point, phase minimum is not being timed, the operation within A phase reverts to the lower half of INA, in this case the vehicle group goes OFF and the transitions to the next phase are as given in the lower half of INA.
- The pedestrian movement is demanded and completes prior to the phase termination point and prior to the point at which phase minimum starts being timed, the operation within A phase reverts to the lower half of INA, in this case the vehicle group goes OFF and the transition to the next phase are as given in the lower half of INA.

The upper half transitions are used when the pedestrian movement is demanded and:

- In the case where the pedestrian movement can overlap the pedestrian movement may continue through the “clearance” part of the running phase and into the next phase. Once the pedestrian demand has been satisfied the colour in the next phase will be that given in the appropriate IN_ for the next phase.
- The pedestrian movement completes prior to the phase termination point, but due to minimum times for giving a display the vehicle group is held RED during the remainder of the phase running intervals. The displayed colour may change during the intergreen intervals if the colour during the intergreen is the same as that which will be displayed during the next phase. Compare the TOB and TOC boxes in the upper and lower halves of INA above.; or
- The pedestrian movement completes after the phase termination point, the operation within A phase remains with the upper half of INA. In this case the vehicle group remains RED until the end of W&CL and the transitions to the next phase are as given in the upper half of INA. The displayed colour may change during the intergreen intervals if the colour during the intergreen is the same as that which will be displayed during the next phase. Compare the TOB and TOC boxes in the upper half of INA above.

3.2.3 Other Types of Protection

A number of pedestrian movements are not protected for the complete walk and clearance intervals, but are protected for WALK or dependent on the length of a timer. In this instance the vehicle group table specification will read similar to the following examples.

Pedestrian protection given for Walk:

INB	CONDITIONAL RED FOR WALK GREEN	TOA	GREEN, GREEN IN A
		TOC	YELLOW, RED, RED IN C

Pedestrian protection timed during Walk (in this example the vehicle group is a roundel):

INC	CONDITIONAL RED FOR TIMER GREEN	TOA	GREEN, GREEN IN A
		TOB	YELLOW, RED, RED IN B

Pedestrian protection given for Walk and timed during Clearance:

INA	CONDITIONAL RED FOR WALK OR ARROW TIME	TOB	RED FOR ARROW TIME, GREEN , GREEN IN B
		TOC	RED FOR ARROW TIME, RED, RED IN C
	OFF	TOB	GREEN, GREEN IN B
		TOC	OFF, RED, RED IN C

In the first and second examples, it is considered that the pedestrian protection will have completed before the running phase terminates, and thus the vehicle group will have reverted to its ‘normal’ colour prior to the phase termination point.

In the third example above, it is considered that the pedestrian protection completion may not be so simply stated and the transitions of the vehicle group will vary in a similar way as to that given above in section 3.2.2 for full protection.

There is a final issue with regard to the protection given a pedestrian movement and that is that after a red aspect is provided it may be replaced with an OFF display for any remaining time of the Walk and Clearance intervals before reverting to its 'normal' colour. This is illustrated in the following two examples.

INB	CONDITIONAL RED FOR ARROW TIME	TOA	OFF, GREEN IN A
	OFF FOR THE REMAINDER OF W&CL OFF	TOC	OFF, RED, RED IN C

or

INA	CONDITIONAL RED FOR ARROW TIME OFF FOR THE REMAINDER OF W&CL	TOB	OFF FOR W&CL, GREEN AT END W&CL, GREEN IN B
		TOC	OFF, RED, RED IN C
	GREEN	TOB	GREEN, GREEN IN B
		TOC	YELLOW, RED, RED IN C

The first format is used where the 'normal' colour is OFF, ie the same as the colour shown during the remainder of walk and clearance. The second format is used where the 'normal' colour is GREEN to allow for differences in the way the vehicle group may transition to the next phase.

4 Vehicle Group Operation

Within the standard tables there a number of statements which may require a little explanation as to the complete meaning. These explanations are given below.

4.1 Filter Phase

A filter phase is one where the vehicle driver is required to obey the Australian Road Rules [9] before deciding to proceed. The driver will see a green roundel and either: three unlit arrows; or no arrows at all.

There are two types of filter movement:

- Left turn filter movements – drivers needs to be watchful for pedestrians crossing the road into which they are turning and vehicles which may be turning right into the same road from the opposite direction;
- Right turn filter movements – drivers needs to be watchful for pedestrians crossing the road into which they are turning; and oncoming vehicles going straight through and those which may be turning left into the same road, both have right of way.

4.2 Overlap

The phasing for an intersection can be set up or operate such that a vehicle group can display GREEN in consecutive phases. When this occurs it may be advantageous and more efficient for the vehicle group to maintain, or overlap, the GREEN during the intergreen intervals of the phase, ie early cut off green, yellow, all red. In addition, there are certain phase movement combinations where the vehicle group may display an overlap GREEN even though the vehicle group is OFF in either the preceding or succeeding phase. This is simply presented below.

Current Phase		Next Phase
Running intervals	Intergreen intervals	Running intervals
GREEN	GREEN	GREEN
OFF	GREEN	GREEN
GREEN	GREEN	OFF

There are certain situations where the overlap must not be allowed to occur even though the vehicle group may be GREEN in consecutive phases. Some common examples of why an overlap may not be allowed:

- There is an opposing right turn filter movement which needs to be given time to clear the intersection.
- A pedestrian movement is to be introduced at the start of the next phase.
- The lane is a shared lane and one of the movements is not allowed in the next phase.

5 Standard Table Format

The following sub-sections describe conventions within the standard tables which might not be self evident to the inexperienced reader.

5.1 Structure




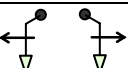
Each table has five sections:

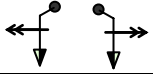

- **Operational Description** – provides a brief, human readable, layman description of how the table operates. This will allow intersection designers to confirm that they have made the correct choice in table request for the Personality development.
- **Typical Application Example** – provides a layman generic situation, in diagrammatic form, where it might be used and the specification that would reflect the example.
- **Example Personality Data** – provides the code that would be generated, with specific situation values for a specific situation. Explanation of the terms used in this section can be found in the Standard Personality Reference Manual, [14]. Note: the code given may not match the generic situation given in the Typical Application Example.
- **Library Macro** – provides the code which is used to generate the standard table code based on the answers given by the user to the questions asked by RGEN. Explanation of the terms used in this section can be found in guidelines for Layout of Macros for Standard Tables, [13].
- **Revision History** – provides a history of the changes to the table, including a brief summary of changes made before the tables were under formal change control procedures. OD, TAE, EPD and LM refer to the sections (identified above) of the table changed/affected.

Changes to the standard Vehicle Group tables are controlled using the Standard Operating Procedure for Personality Standard Tables Management, [6]. The operational description, typical application example and example personality data can be extracted and used to form the notes file used in RGEN to aid the Personality developers. The Library Macro can be extracted to form the macro used in RGEN.

5.2 Definitions and Abbreviations

The following definitions and abbreviations are used within the layman sections of the standard tables:

Term	Meaning
ECG	Early Cut-off Green – refers to the early cut-off green interval of the phase. The ECG is the first of the three intergreen (or phase clearance) intervals.
ECO	Early Cut Off – a process where vehicle groups can be terminated at the start of ECG, rather than the end of ECG.
EPD	Example Personality Data
LM	Library Macro
LTOR	Left Turn On Red
OD	Operational Description
TAE	Typical Application Example
(n)	Implies the approach marked by n in the phase diagrams.
	Used to signify a one aspect lantern
	Used to signify a two aspect lantern
	Used to signify a three aspect lantern
	Used to signify a one aspect left or right turn lantern

Term	Meaning
	Used to signify a two aspect left or right turn lantern
	Used to signify a three aspect left or right turn lantern

5.3 SCATS Signal Pulses

The Personality can be structured as to provide different modes of operation dependent on the presence, or not, of a signal from SCATS. In the vehicle group standard tables use is made of the Z- (ZNEG) and Z+ (ZPOS) signals.

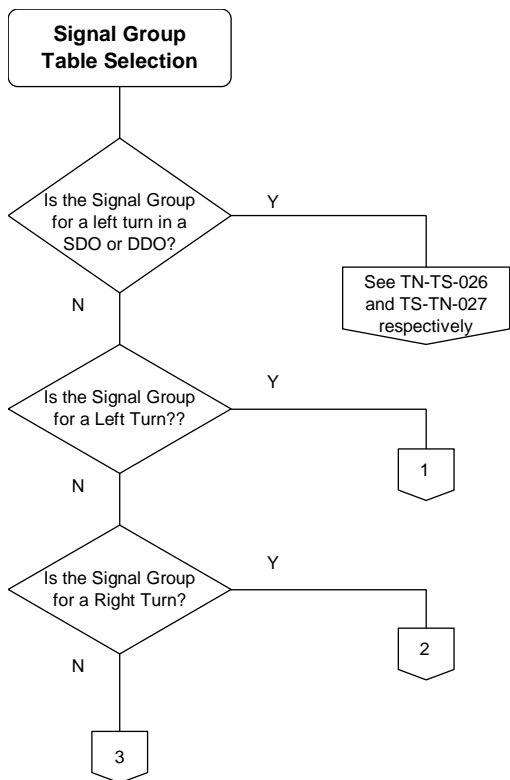
Generally, the presence of the:

- Z- signal is used to allow filtering at intersections where it can be useful to stop filtering at certain times of the day, and
- Z+ is used to include a repeat phase in the operation of the intersection.

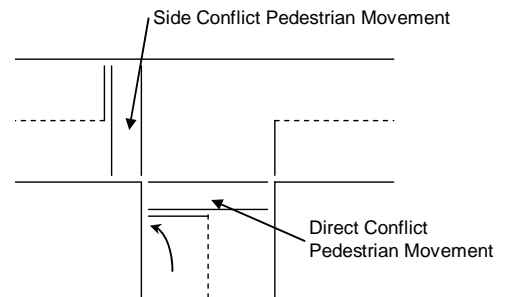
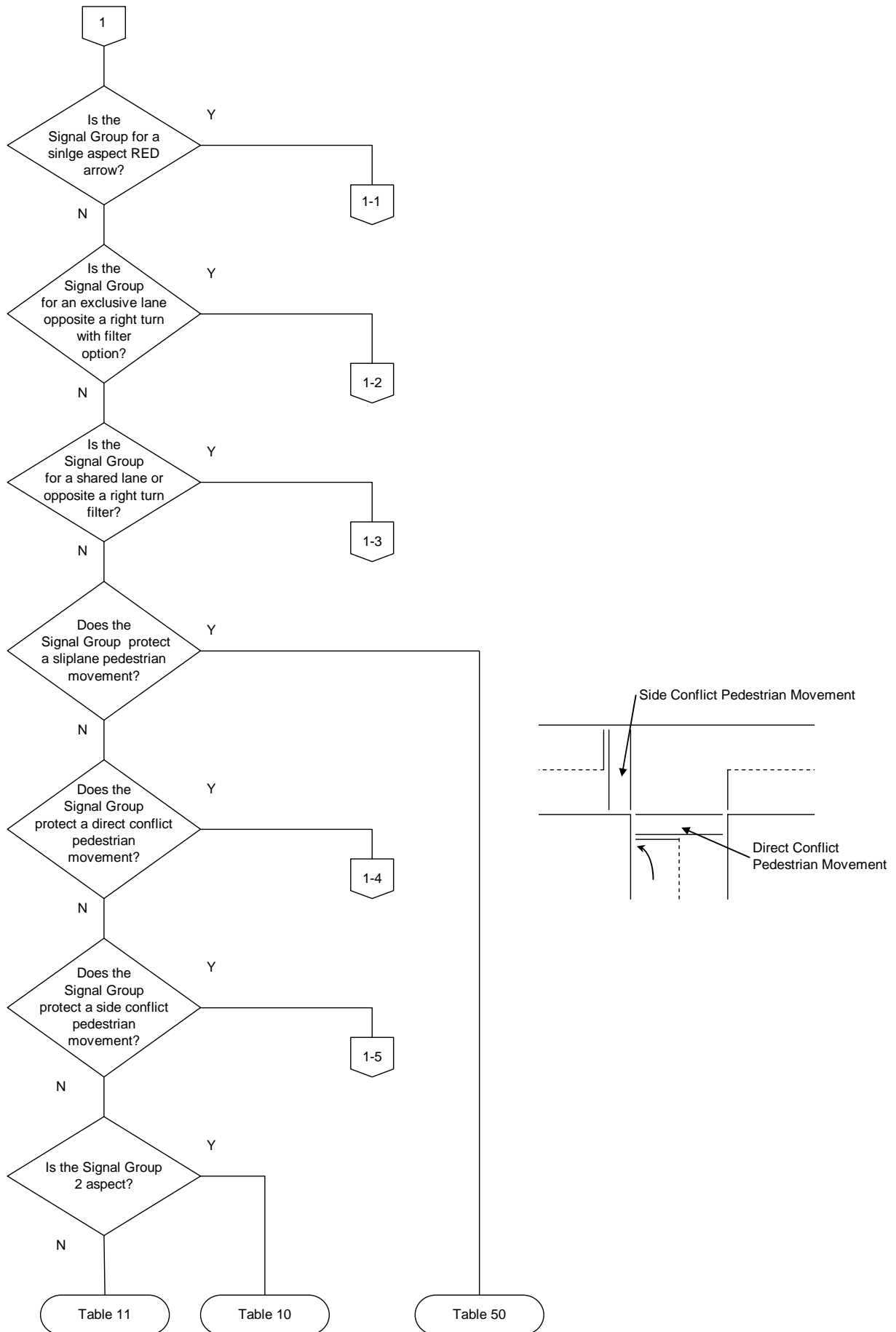
6 Standard Table Selection Charts

Those tables which are shaded  do not currently exist, but have been identified for completeness.

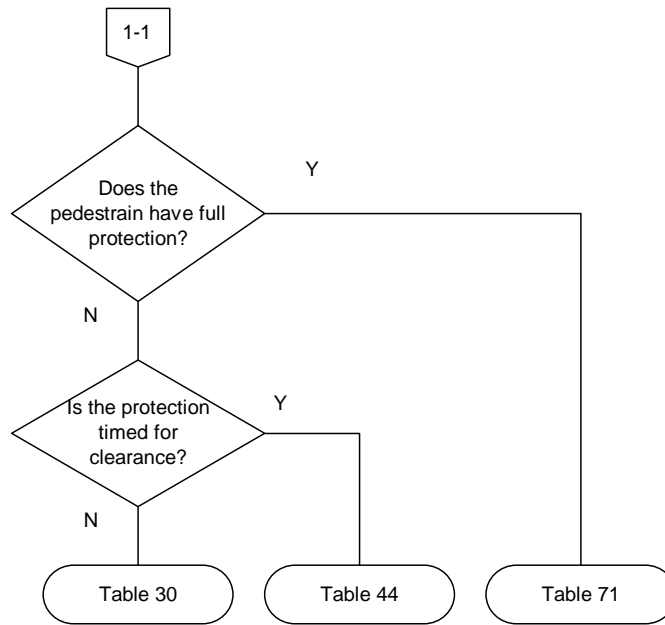
6.1 Main Selection Chart



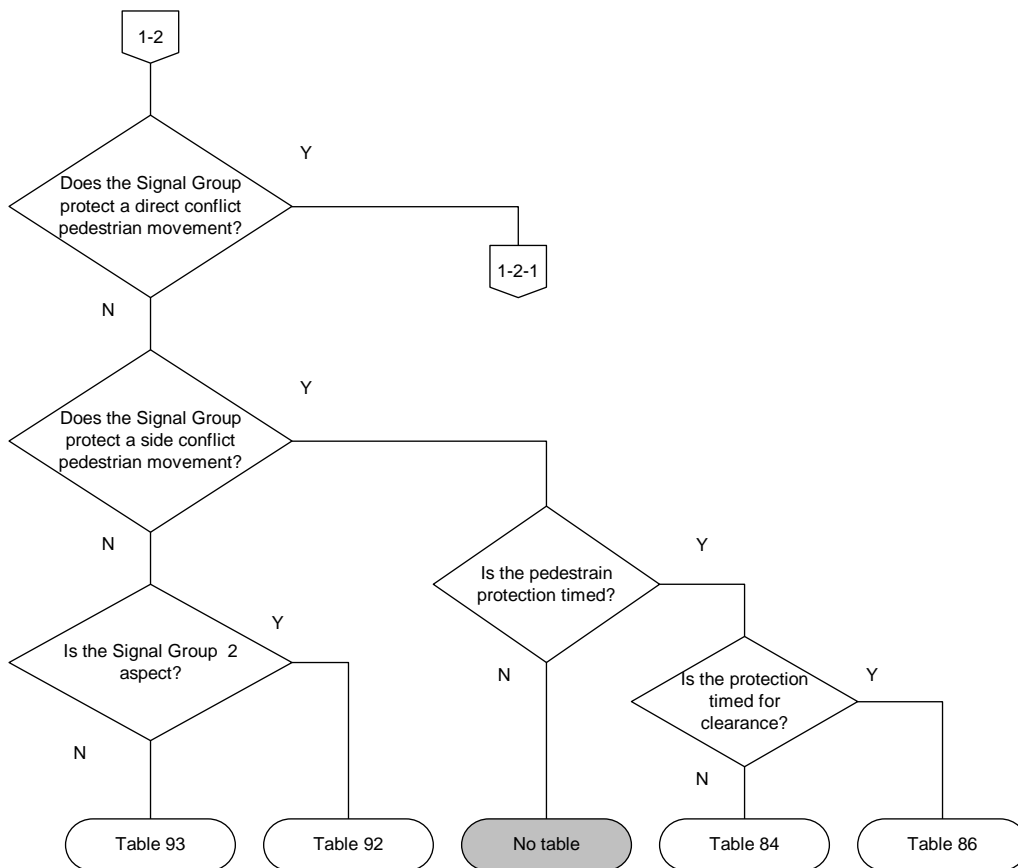
6.2 Left Turn Selection Chart – Sheet I



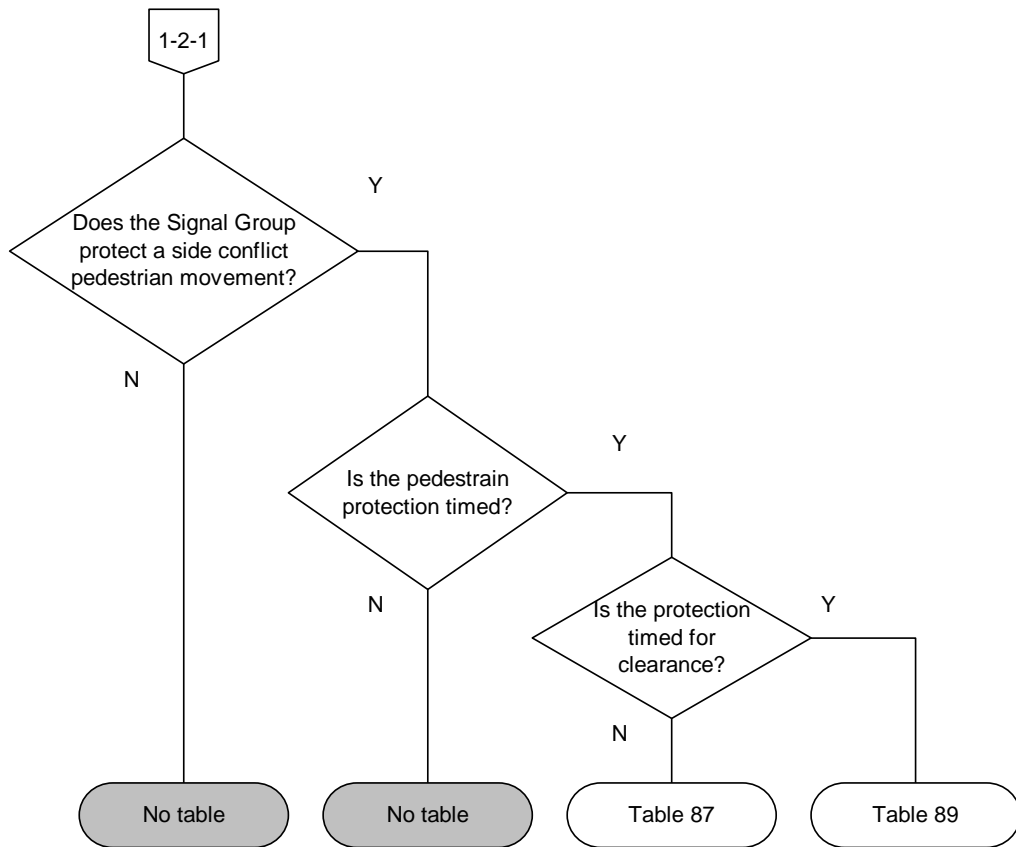
6.3 Left Turn Selection Chart – Sheet 1-1



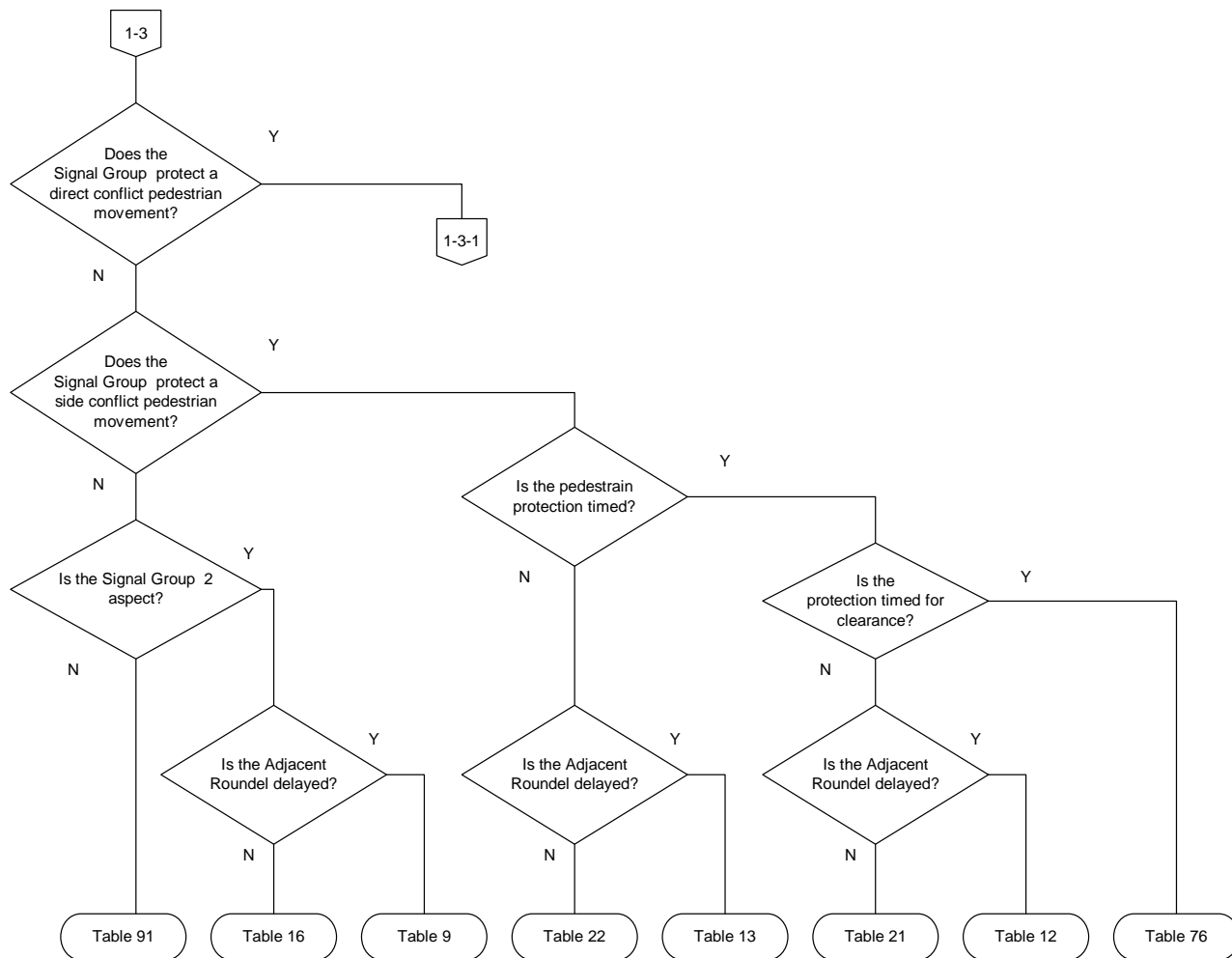
6.4 Left Turn Selection Chart – Sheet 1-2



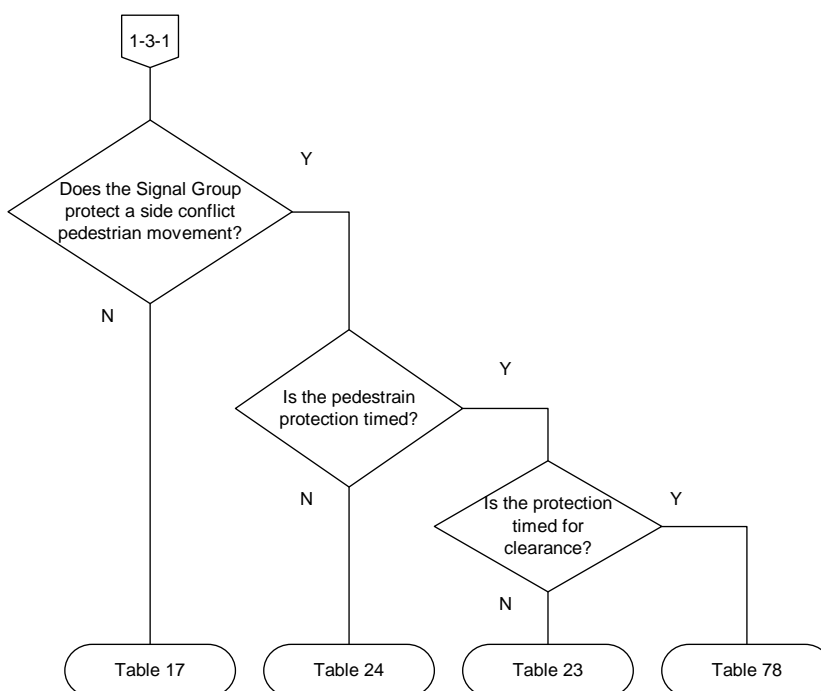
6.5 Left Turn Selection Chart – Sheet 1-2-1



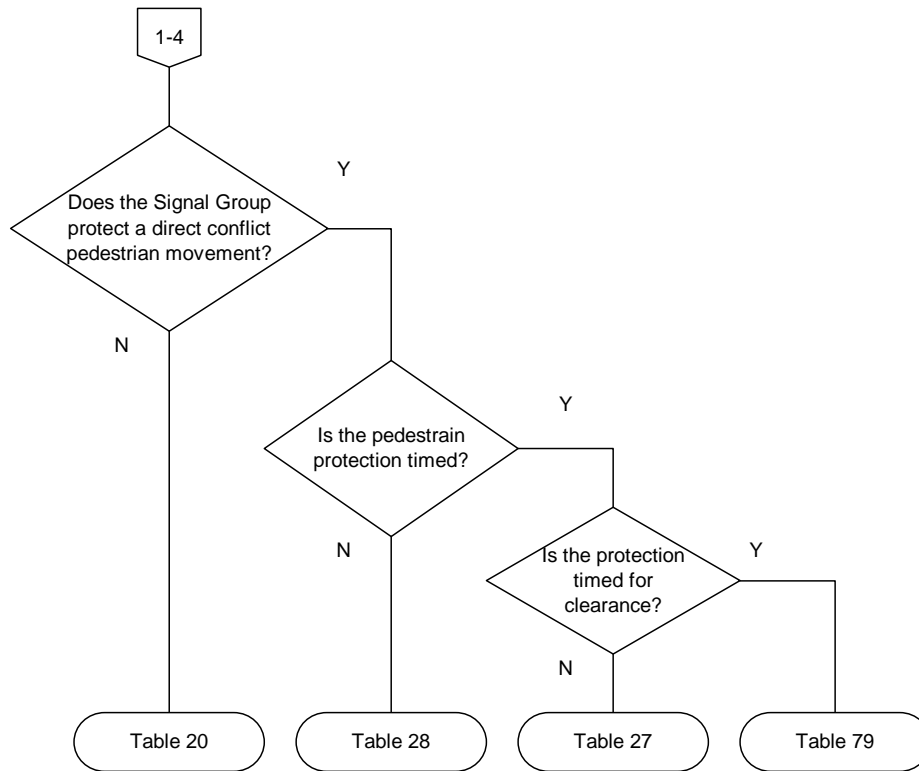
6.6 Left Turn Selection Chart – Sheet I-3



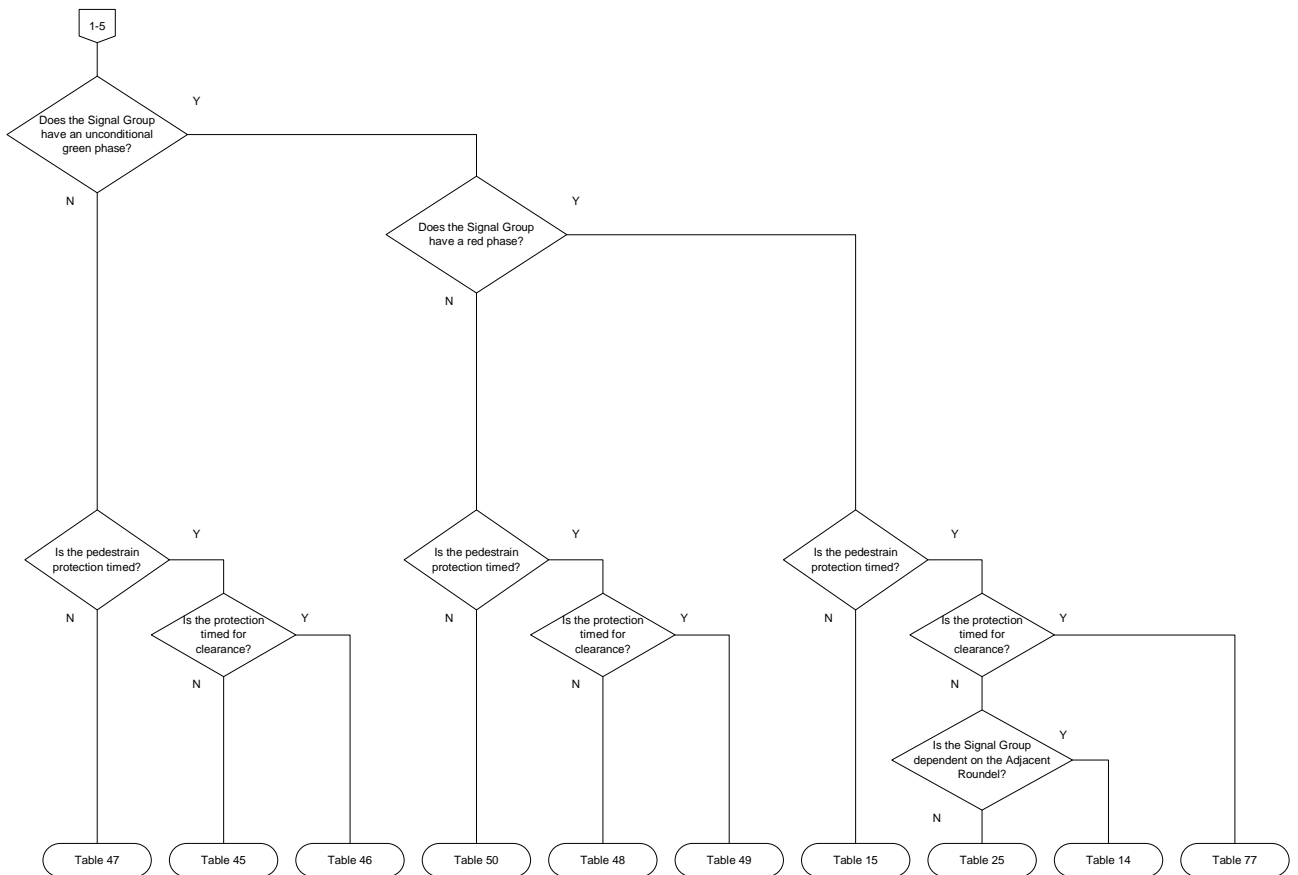
6.7 Left Turn Selection Chart – Sheet I-3-I



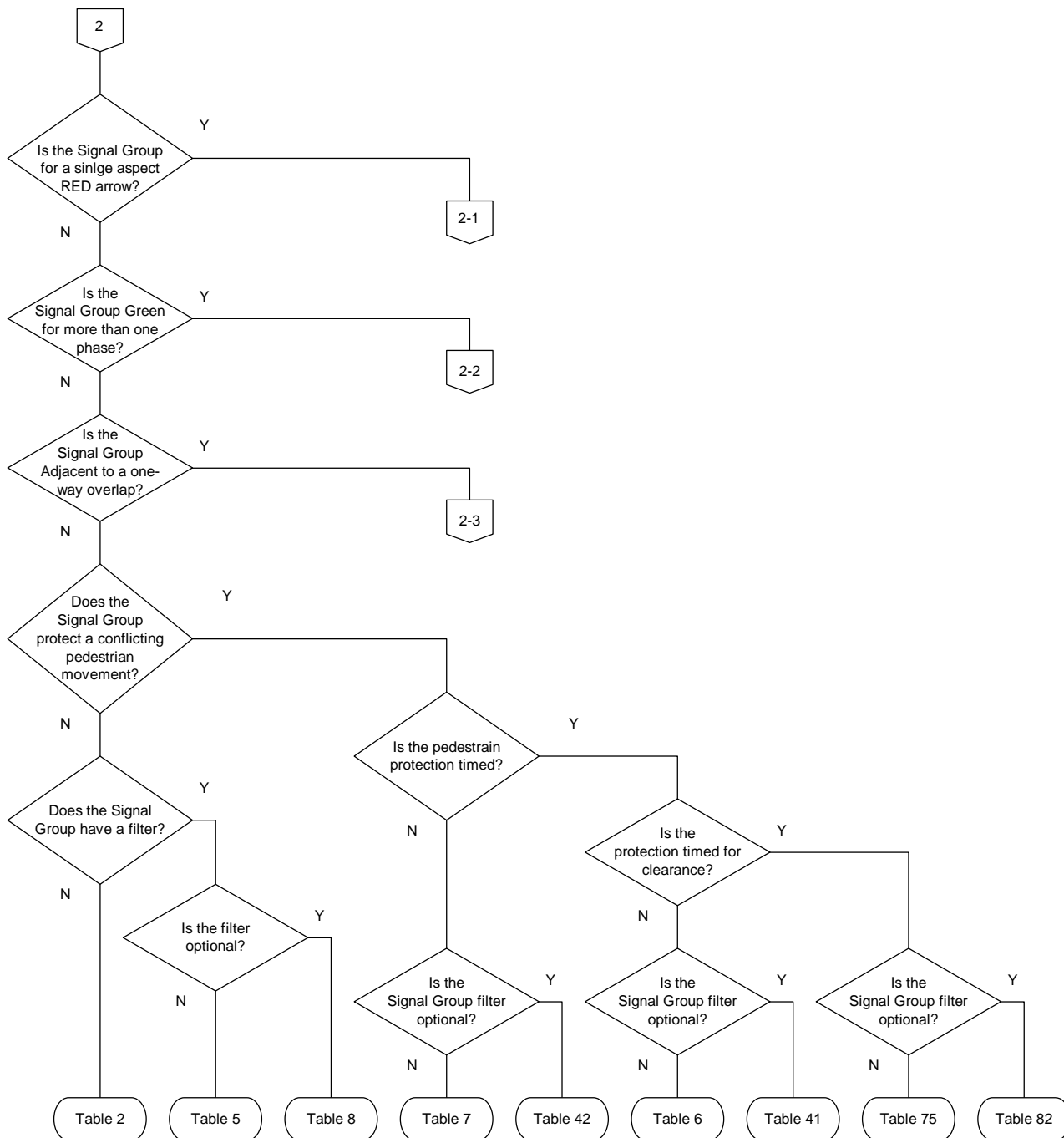
6.8 Left Turn Selection Chart – Sheet I-4



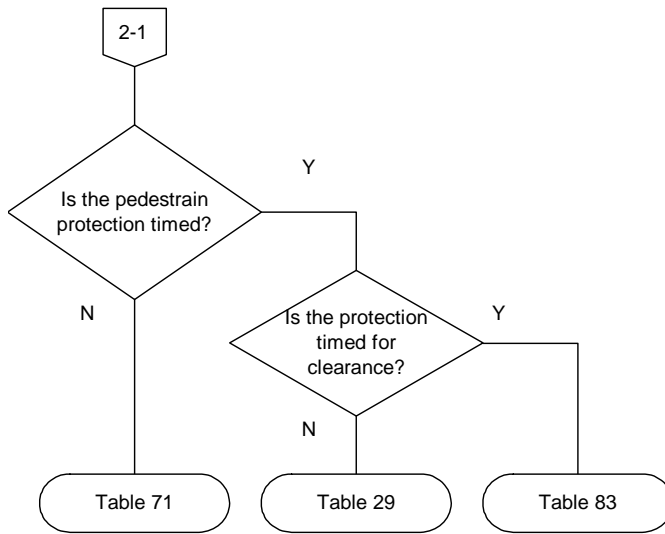
6.9 Left Turn Selection Chart – Sheet I-5



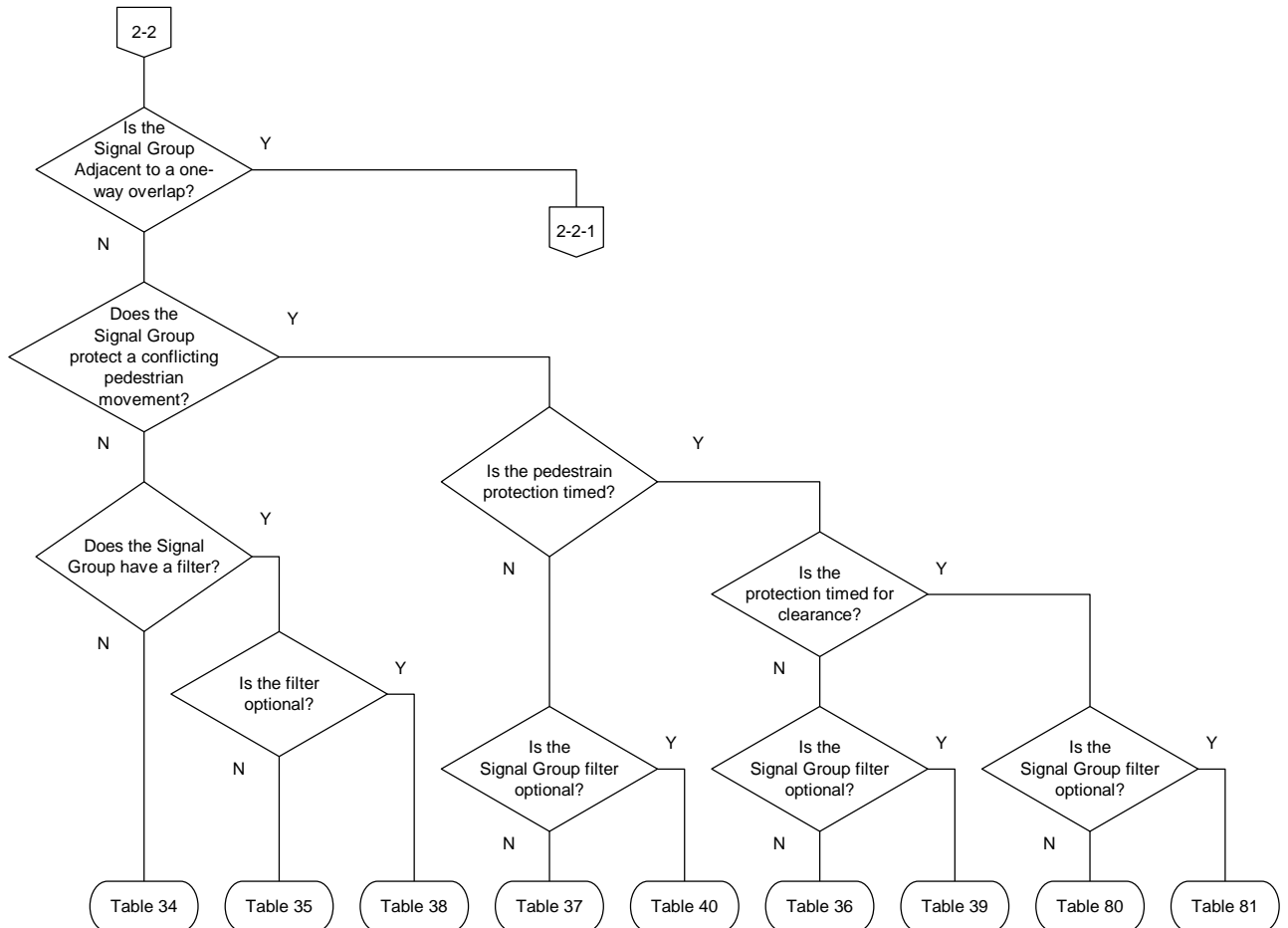
6.10 Right Turn Selection Chart – Sheet 2



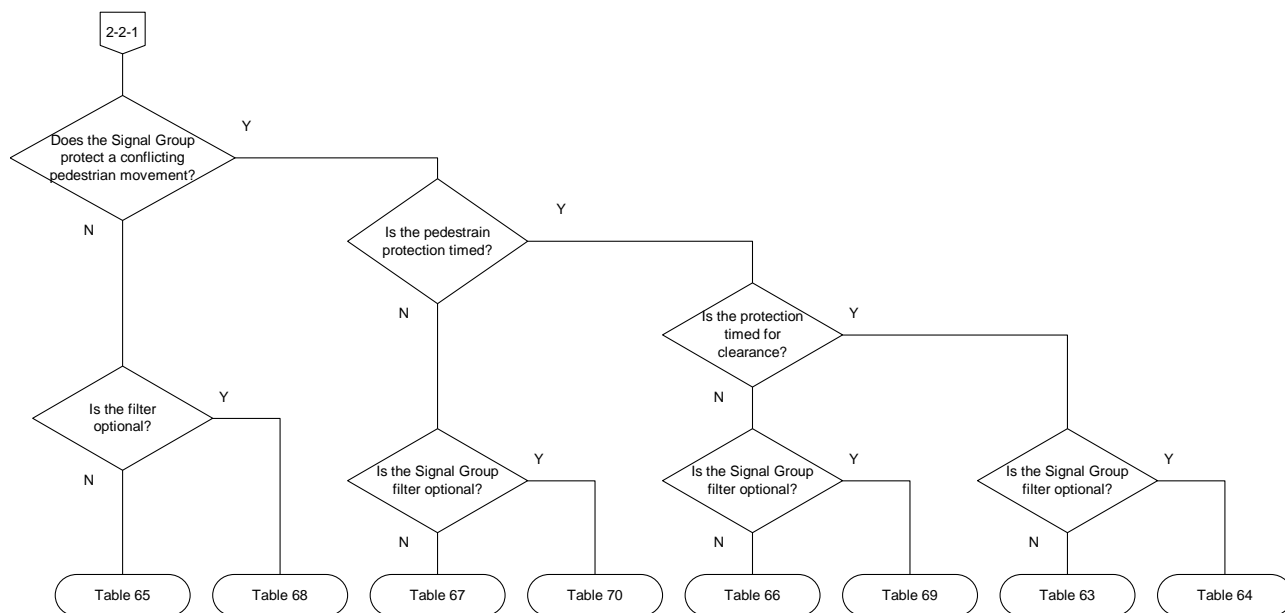
6.11 Right Turn Selection Chart – Sheet 2-1



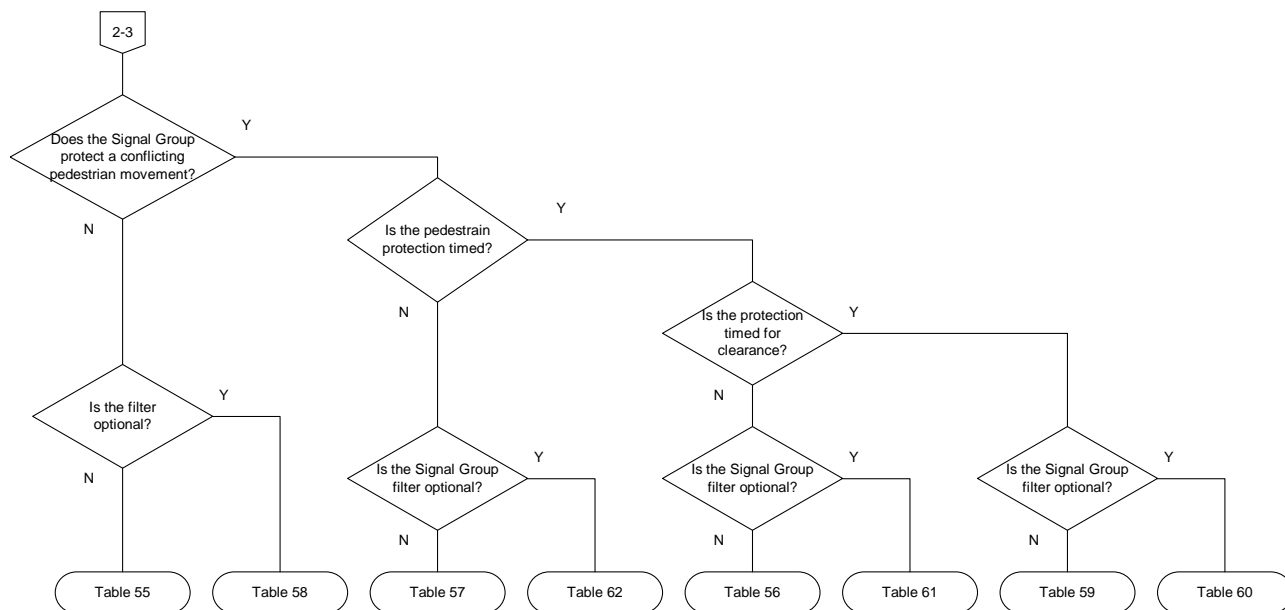
6.12 Right Turn Selection Chart – Sheet 2-2



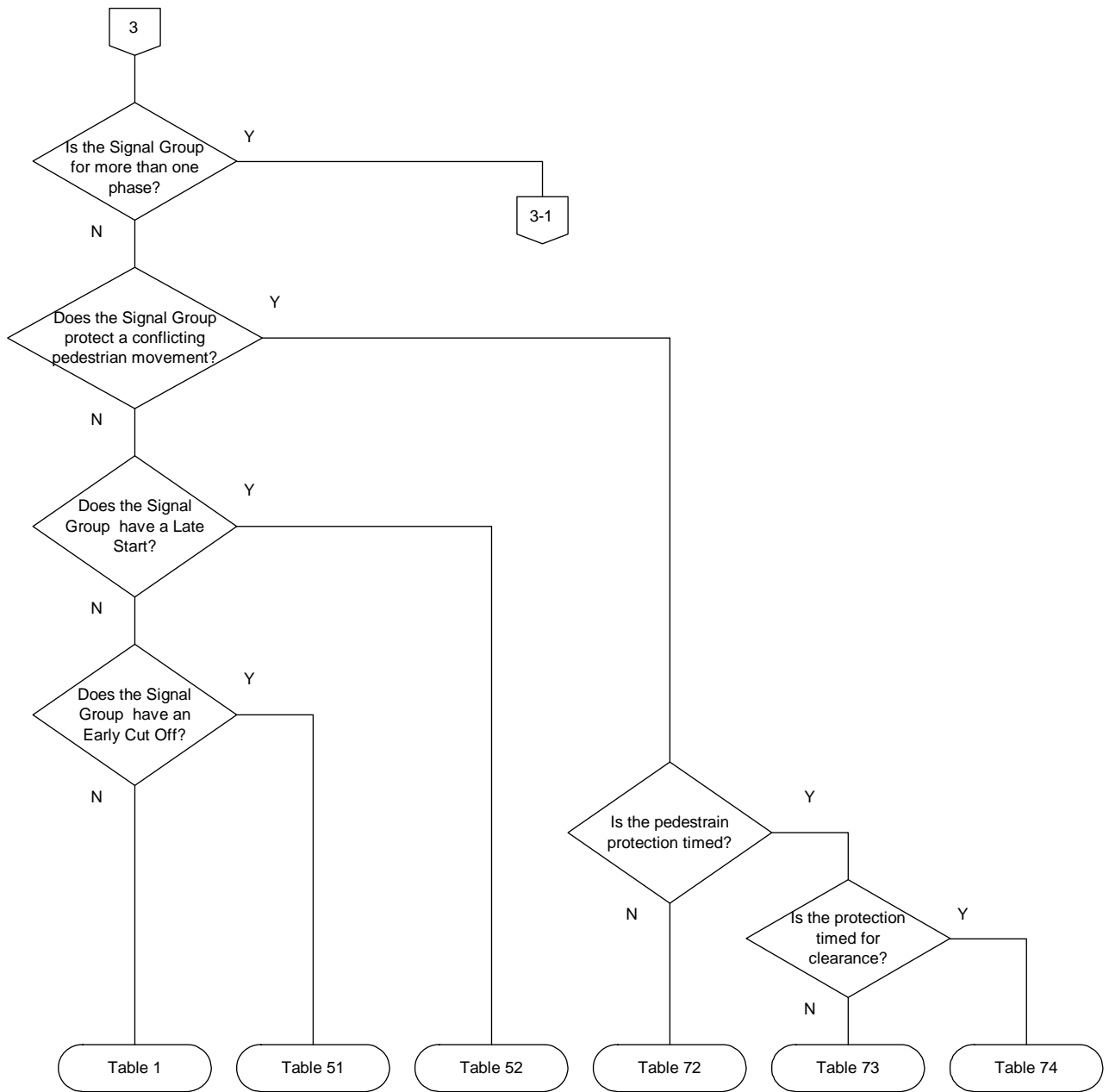
6.13 Right Turn Selection Chart – Sheet 2-2-1



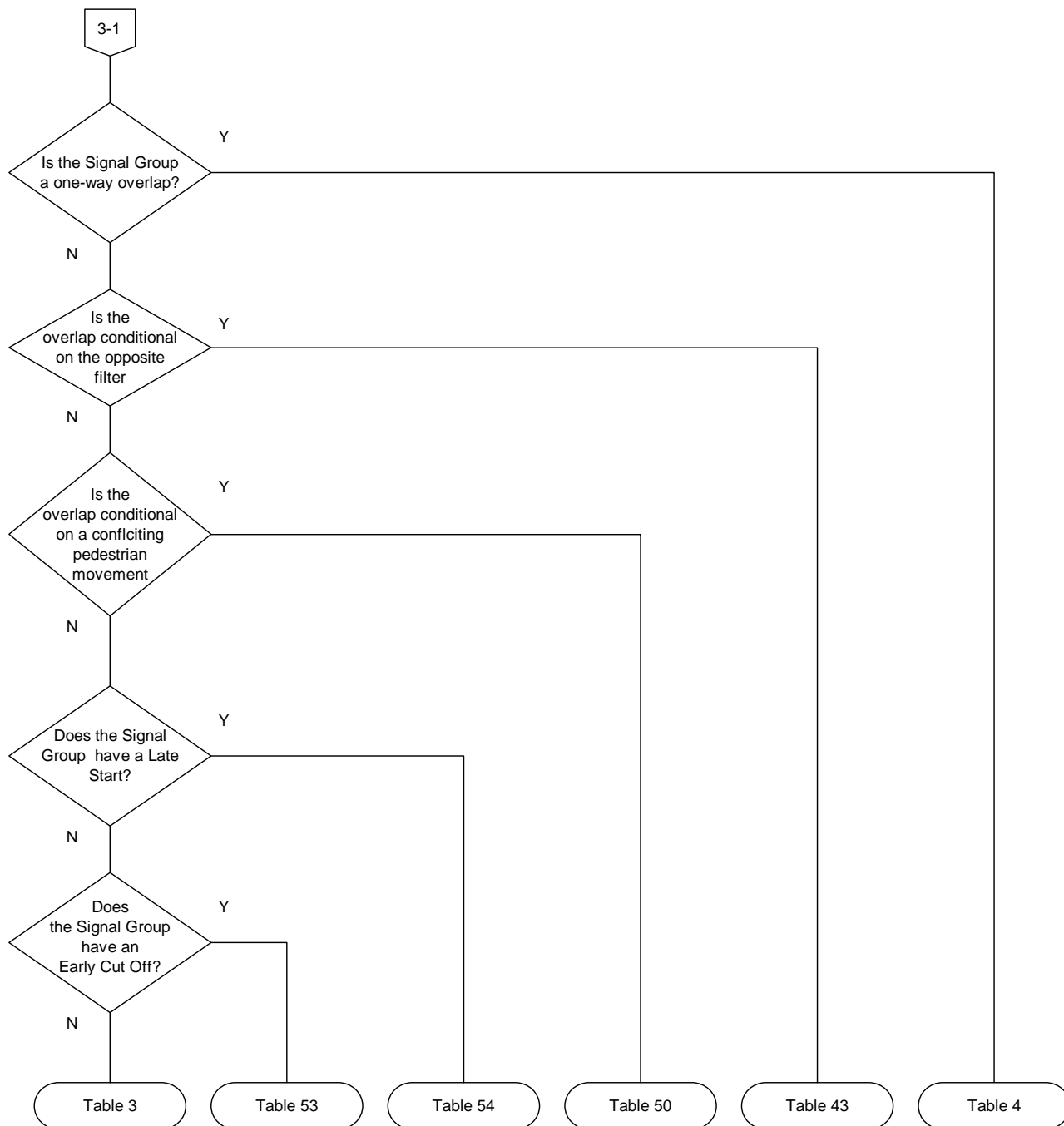
6.14 Right Turn Selection Chart – Sheet 2-3



6.15 Main Signal Selection Chart – Sheet 3



6.16 Main Signal Selection Chart – Sheet 3-1



7 Standard Table Selection Guides

Each table of the Vehicle Group Standards is covered separately, illustrating the default entries in the Signal Group Colour Table and the associated Signal group Condition Table. Entries in the Signal Group Minimum Table and the Signal Group Special Movement Table are also shown where these are required.

Flag 0 is reserved for including or skipping the LATE START interval in each phase.

Flag 63 is reserved for latching the state of the Z- signal for use where the inclusion of a right turn filter is optional.

Flag 59 is reserved for latching the state of the Z- signal for use where the inclusion of an opposite right turn filter is optional.

7.1 Selection Guide for Main Signals

7.1.1 Single Phase

Full roundel which is green in one phase only

Standard	Table 1
Early Cut off	Table 51
Late Start	Table 52
Pedestrian protection timed during walk	Table 73
Pedestrian protection timed during walk and part clearance	Table 74
Pedestrian protection for walk & clearance	Table 72

7.1.2 Multiple Phases

Full roundel which is green in more than one phase

Standard	Table 3
One way overlap	Table 4
Overlap conditional on opposite optional filter	Table 43
Overlap conditional on conflicting pedestrian movement	Table 50
Early Cut off	Table 53
Late Start	Table 54

7.2 Selection Guide for Right Turn Arrows

7.2.1 Single Aspect

Pedestrian protection timed during walk	Table 29
Pedestrian protection timed during walk and part clearance	Table 83
Pedestrian protection for walk & clearance	Table 71

7.2.2 Standard Three Aspect

Green in one phase only	No Pedestrian	Pedestrian Protection		
		timed during walk	timed during clearance	for walk & clearance
No filter	2	-	-	-
Filter	5	6	75	7
Filter option	8	41	82	42

The following tables should be used where the adjacent major vehicle group provides a one-way overlap, ie tables 4 or 43.

Green in one phase only	No Pedestrian	Pedestrian Protection		
		timed during walk	timed during clearance	for walk & clearance
Filter	55	56	59	57
Filter option	58	61	60	62

Green in more than one phase	No Pedestrian	Pedestrian Protection		
		timed during walk	timed during clearance	for walk & clearance
No filter	34	-	-	-
Filter	35	36	80	37
Filter option	38	39	81	40

The following tables should be used where the adjacent major vehicle group provides a one-way overlap, ie tables 4 or 43.

Green in more than one phase	No Pedestrian	Pedestrian Protection		
		timed during walk	timed during clearance	for walk & clearance
Filter	65	66	63	67
Filter option	68	69	64	70

7.3 Left Turn Arrows

7.3.1 Single Aspect

- Pedestrian protection timed during walk Table 30
- Pedestrian protection timed during walk and part clearance Table 44
- Pedestrian protection for walk & clearance Table 71

7.3.2 No Direct Conflicting Pedestrian Movement

	No Pedestrian		Side Pedestrian Protection		
	2 aspect	3 aspect	timed during walk	timed during clearance	for walk & clearance
Shared lane or opposite right turn filter	16 (9)	91	21 (12)	76	22 (13)
Exclusive lane, opposite right turn filter - optional	92	93	84	86	-
Exclusive lane, no opposite right turn filter	10	11	25 (14)	77	15
— with no unconditional green phase	-	-	45	46	47
— with no red phase	-	-	48	49	50

Tables in parenthesis () should be used where it is necessary for the Vehicle Group to be dependant on the colour displayed by the adjacent roundel.

Table 50 may also be used for protecting a conflicting pedestrian movement on a slip lane.

7.3.3 Direct Conflicting Pedestrian Movement

	No Parallel Pedestrian	Side Pedestrian Protection		
		timed during walk	timed during clearance	for walk & clearance
Shared lane or opposite right turn filter	17	23	78	24
Exclusive lane, opposite right turn filter - optional	-	87	89	-
Exclusive lane, no opposite right turn filter	20	27	79	28

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