improving public transport through technology

Use of Non-Passenger Stops in Real Time Systems

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This document is Published.

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1 Introduction

1.1 About this document

1.1.1 This report has been produced for members of RTIG Inform and those interested in the provision of bus information to the public. The purpose of the report is to provide advice on the creation and use in the United Kingdom of non-passenger bus stops with an area code of 999.

1.2 Background and context

1.2.1 There is a requirement to indicate non-passenger stops (driver rests, driver change over, depots, and waiting time stops) so that these can be included in TransXChange (TXC) files in National Coach Service Database (NCSD), and Bus Open Data Service (BODS) without requiring a stop to be created in the NaPTAN database by an authority. These locations are not used by the public to access or exit public transport, they are required for operational management purposes by operators.

1.2.2 The inclusion of non-passenger stops will allow for improved public information through improved real time predictions, particular where a journey is due to be operated by a vehicle on its first journey of the day, or driver rests between journeys.

1.2.3 Operationally it will provide consistency of information to drivers and operational systems improving day to day management of the bus services.

1.2.4 Historically for a bus stop to be created in NaPTAN the local transport authority has to create the bus stop which the operator can then download and use in their systems. This process is time consuming and understandably there is often reticence to create bus stops in NaPTAN which are not for public use.

1.2.5 Whilst operators can often create bus stops in their timetable management systems there is always a risk of AtcoCode duplication and there is no management of who is creating what stops in data.

1.2.6 To overcome these challenges a new ATCO area code of 999 has been created, this is specifically for operators use and should not be used by transport authorities or other organisations.

1.2.7 Non-passenger stops with a 999-area code are not designed for publishing to passengers.

1.3 Scope

1.3.1 This report has no statutory or other legal basis and is purely to provide advice to suppliers, local authorities and bus operators who operate real time information systems in the bus industry.

1.3.2 All aspects of a real time system: from originating source data through to dissemination channels, are potentially impacted by this report.

1.4 Limitations and the Future

1.4.1 This report reflects the available technology and those practices which have been found to be effective at the date of publication. However, technology and its applications are evolving and it is therefore probable that new technologies, new developments of existing technologies, and new ways to adopt them on buses will evolve.

1.4.2 RTIG also understands that technologies and practices which are not on the market at the time of writing this document will evolve, and that such developments should not be excluded from consideration.

1.4.3 Operators and authorities are encouraged to consider new approaches - bearing in mind the general principles promoted in this document.

1.5 Acknowledgements

1.5.1 RTIG is grateful to bus operators and system suppliers for encouraging the development of this document.

2 Creating Non-Passenger Stops

2.1 ATCO Area

2.1.1 To assist bus operators with the management of operational aspects of bus services a new ATCO area code of 999 has been created, this is specifically for operators use and should not be used by transport authorities or other organisations.

2.2 Assumptions

2.2.1 Where stops in the 999 area non-passenger stop are being used in a data source such as TransXChange, or NeTEx there should be no assumption that the receiving organisation has any information about the stop – therefore there is data about that stop beyond the AtcoCode which must be provided.

2.2.2 When the stop reference is used in SIRI data it can be assumed that the consuming system has some prior knowledge of the stop data from consuming planning data in TransXChange or NeTEx, or another source.

2.2.3 A 999-area code operator bus stop shall include the National Operator Code for the creating operator, this will enable an operator to create stop numbers without needing to coordinate with another organisation.

2.2.4 Once a AtcoCode is allocated by an operator to a location it should be used consistently as the reference for that location and not be re-used for another location.

2.2.5 Stops with a 999 area code are not designed for publishing to the public.

3 Supplying Non-Passenger Stop Information

3.1.1 Providing information to passengers is carried out by a number of different organisations, who manage data in different ways using different IT systems.

3.1.2 For bus stops with an area code of 999 data about these bus stops will not be available in NaPTAN, therefore there is some information about the non-passenger bus stop which needs to be provided in the planning data.

3.2 Mandatory Fields

3.2.1 AtcoCode

3.2.1.1 This is an identifier of up to twelve characters. This is designed to provide uniqueness in the UK.

3.2.1.2 The format for an AtcoCode is 9990xxxxxxxx

3.2.1.3 The first three characters denote the authority responsible for the stop. In this case this will be 999 as it is an operator specifying the stop details.

3.2.1.4 The fourth character is a 0 (zero).

3.2.1.5 The remaining eight characters are determined locally.

3.2.1.6 To ensure that a stop created by an operator has a unique reference it is required that the first characters of the eight-character block are the operators NOC code.

3.2.1.7 For example a stop created by Team Pennine (NOCCode of TPEN) would be:

9990TPEN1 or 9990TPEN0001

3.2.2 This structure allows each operator / NOC to create and manage data for a minimum of 9,999 non-passenger stops.

3.2.3 CommonName

3.2.3.1 This should be a simple descriptive name for the non-passenger stop. For example ‘Waterloo Depot’.

3.2.3.2 The CommonName structure supports multiple languages where necessary for example to support the requirements of the Welsh language act.

3.2.3.3 **Character Set**: Only uppercase and lower case letters should be used in names. Accented characters are permitted. Hyphens may be used within names, for example ‘*Hutton-le-Hole’,* as may apostrophes, for example *‘St Margarets’* and ampersands, for example *‘Bat & Ball’*.

3.2.4 Specifically the use of digits, non-alphabetic characters, and any punctuation characters other than apostrophes and hyphens should be avoided in common names and locality names. Numbers should be spelt out e.g. *'Seven Sisters'*, ***not*** *'7 Sisters'.* Certain characters are forbidden in names by the *NaPTAN* schema; in particular commas and the other characters should ***not*** be used as their use will render it invalid:

Table 1 Characters that are invalid for use in Common Names

Character	Name	Why character is reserved.
,	Comma	Used as separator for qualifier
[	Left Square Bracket	Used to format output
]	Right Square Bracket	Used to format output
{	Left Brace	Used to format output
}	Right Brace	Used to format output
^	Caret	Inappropriate
=	Equals	Inappropriate
@	at	Inappropriate
:	colon	May be used to format output
;	semicolon	May be used to format output
#	hash	Input expression
$	Dollar	Input expression
£	Pound	Inappropriate
?	Question mark	Inappropriate
%	Percent	Input expression

3.2.5 The use of certain other non-alphabetic characters is also strongly discouraged as they may be rejected by some consuming systems.

Table 2 Characters Not To Be Used in Common Names

Character	Name	Why character is discouraged.
+	plus	Input expression
<	Left than	Used to format output
>	Greater than	Used to format output

«	Left guillemot	Used to format output
»	Right guillemot	Used to format output
\	Back slash	Better to use alternative name
/	Forward slash	Better to use alternative name
|	at	Better to use alternative name
~	tilde	Inappropriate
_	underscore	Inappropriate
¬	hash	Input expression

3.2.6 NptgLocalityRef

3.2.6.1 The NPTG locality within which stop lies and should be the code of the lowest level locality in which the non-passenger bus stop is located.

3.2.6.2 In the absence of a source of NPTG localities this could be identified by reviewing the NPTG references for nearby stops. This is not the ideal solution or practice but a pragmatic approach where a map of NPTG localities is not available to the operator.

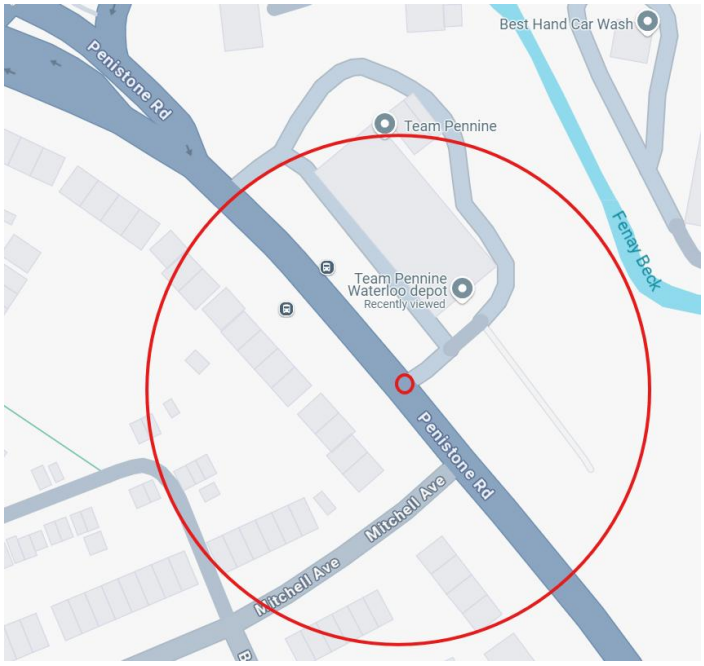
3.2.7 Location

3.2.7.1 This should be a location that a bus will be able to safely traverse or stop at.

3.2.7.2 The location should be to 1m precision and provided using both Ordnance Survey (all numeric grid reference to 10 figures or more) and Latitude and Longitude.

3.2.7.3 For the Team Pennine Waterloo Depot the location for the depot stop could be the exit gate for the depot, as all vehicles leaving the depot will go through the geofence for the stop.

Table 3 Map of Team Pennine Waterloo Depot with a 50m geofence shown



3.2.7.4 In this example the 50m radius of a geofence around the stop will pick up movements of vehicles within the depot causing vehicles logged in to potentially triggering early departure in real time systems. In these circumstances such as this it may be necessary to configure the non-passenger stop to be a short distance away from the depot on the public road to stop false triggering of departures and other unwelcome behaviour in data consuming systems.

3.2.7.5 For some locations, large depots being an example, there may need to be more than one bus stop created for the depot to ensure that each depot exit is covered, and the timetable route data (JourneyPattern in TXC) configured to use the correct depot exit. Where vehicles may use multiple depot exits for the same service the 'depot' stop may need to be on the highway at a location where all vehicles for that service will pass through the geofence. This is necessary because the size of the geofence for all consuming systems may not be managed or configurable by the operator, so a single stop with a large geofence may not be possible to arrange, nor desirable if the geofence could pick up in service vehicles on the public road network.

3.2.7.6 It may be necessary to test different locations to achieve the optimal behaviour in data consuming systems such as real time prediction engines.

3.2.8 Stop Type

3.2.8.1 All 999 stops shall have a stop type of busCoachTramStopOnStreet / BCT.

3.2.9 BusStopType

3.2.9.1 This shall be ‘custom’ / CUS – Custom as these will not be marked locations with pole and flag.

3.2.10 TimingStatus

3.2.10.1 Timing status shall be set to ‘TIP’.

3.2.10.2 Non-passenger stops should not be used for formal timing of services which for OTC purposes are required to be marked passenger stops.

3.2.11 BusStopClassification

3.2.11.1 All non-passenger bus stops shall be ‘UnmarkedPoint’

3.2.12 Bearing

3.2.12.1 Enumerated eight values, one off: N, S, E, W, NE, NW, SE , SW.

3.2.13 AdministrativeAreaRef

3.2.13.1 This should be set to the administrative area code in which the non-passenger stop is located. The relevant codes can be found in the document: NPTG and NaPTAN Schema Guide.

3.2.14 Public

3.2.14.1 The default for this is True, for non-passenger stops this must be set to False.

3.2.14.2 Note: that the element Public is only available in TransXChange and NaPTAN versions 2.4 onwards.

3.3 Other fields

3.3.1 StopArea

3.3.1.1 These may be helpful for consuming systems where there are multiple non-passenger stops representing for example a multiple exit depot.

4 Use in TransXChange

4.1 WaitTime

4.1.1 This set the time to wait at the referenced stop; the wait time is the part of the Overall Wait Time at the stop that has been ascribed to end of the link represented by the stop usage. When calculating departure times for a specific vehicle journey, the timing link **WaitTime** values from the respective stop usage ends of the incoming and outgoing links are added together to create the total wait time at the stop.

4.1.2 Unless a vehicle will not stop (see Activity), because the use cases for non-passenger stops have activities such as driver change, or driver break the WaitTime element should be populated with the appropriate expected duration that the vehicle will stop.

4.2 Activity

4.2.1 Where a stop is used as a route marker to enable passenger information systems or operational systems to route vehicles along the correct road and the vehicle not stop, then **Activity** must be set to *pass*.

4.2.2 Where the vehicle will stop then to ensure that any WaitTime which is set is honoured then **Activity** can be set to *pickUp*, *setDown*, *pickUpAndSetDown* as appropriate, the default **Activity** behaviour is *pickUpAndSetDown.*

5 Consuming Non-Passenger Stops

5.1 Data Consumers

5.1.1 Data consumers will need to consume and process data on non-passenger stops even though through they are not for presentation to passengers.

5.1.2 Where a data consuming system has no prior knowledge of the non-passenger stop and the necessary minimum data is not provided in the data files the creating operator can be identified through the NOC code embedded in the AtcoCode.

5.1.3 The non-passenger stops will need to be processes as part of timetable processing as they will data necessary for a complete understanding of the planned route and timetable.

5.1.4 For example they will be referenced in journey patterns in TXC and contain data such as the run times between stops and **WaitTime** necessary to correctly understand the timetable, non-passenger and public bus stops will therefore need to be appropriately processed.

5.1.5 Likewise for real time passenger information and operational management systems they will provide important information for the purposes of dead runs and cross journey data necessary to improve bus stop predictions.

5.1.6 Data consumers can ignore the behaviour set in Activity for the purpose of passenger information, but operational systems will need to reflect Activity.

5.2 Display

5.2.1 Non-Passenger stops should not be included in passenger facing outputs, for example they should not be visible on a map showing bus stops, and not shown on a timetable.

6 Example Non-Passenger StopPoint

6.1 Example 1

6.1.1 This example is based on the Team Pennine Waterloo Depot location.

```
<StopPoint>
        <AtcoCode>9990TPEN0001</AtcoCode>
        <Descriptor>
                <CommonName>Waterloo Depot </CommonName>
        </Descriptor>
        <Place>
                <NptgLocalityRef>E0033797</NptgLocalityRef>
                <Location>
                        <Easting>417673</Easting>
                        <Northing>416444</Northing>
                </Location>
        </Place>
        <StopClassification>
                <StopType>BCT</StopType>
                <OnStreet>
                        <Bus>
                                <BusStopType>CUS</BusStopType>
                                <TimingStatus>OTH</TimingStatus>
                                <UnmarkedPoint>
                                        <Bearing>
                                                <CompassPoint>SW</CompassPoint>
                                        </Bearing>
                                </UnmarkedPoint>
                        </Bus>
                </OnStreet>
        </StopClassification>
        <AdministrativeAreaRef>107</AdministrativeAreaRef>
        <Public>False</Public>
</StopPoint>
```

Appendix 1 Glossary

ATCO	Association of Transport Coordinating Officers
BODS	Bus Open Data Service
NaPTAN	National Access Point
NCSD	National Coach Service Database
NeTEx	Network Timetable Exchange
NOC	National Operator Code
NPTG	National Public Transport Gazetteer
RTIG	Real Time Information Group
SIRI	Standard Interface for Real-time Information
TXC	TransXChange