



Department
for Transport

Flexible Bus Service data In BODS

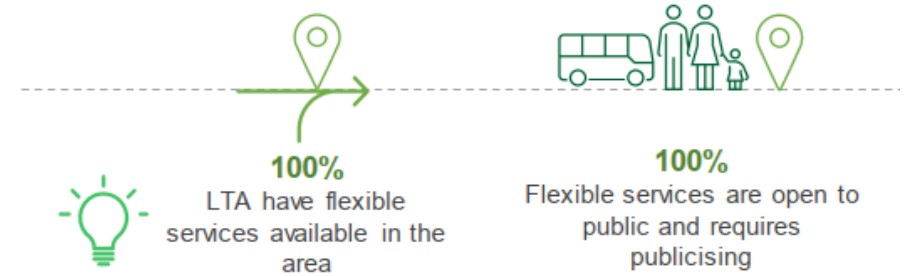
Tim Rivett

14 September 2023



The Problem

- **BODS Fixed route & Fixed timetable**
- Increased use of not-fixed networks
- **Core network for transport authorities**
- Not currently in BODS
- **Discovery project – November 2021**



Awareness

- Using BODS data alone parts of country have no public transport
- Increasing areas covered by some form flexible service
- Rural funds
- BSIP
- Costly to operate – need greater visibility to make viable



60%

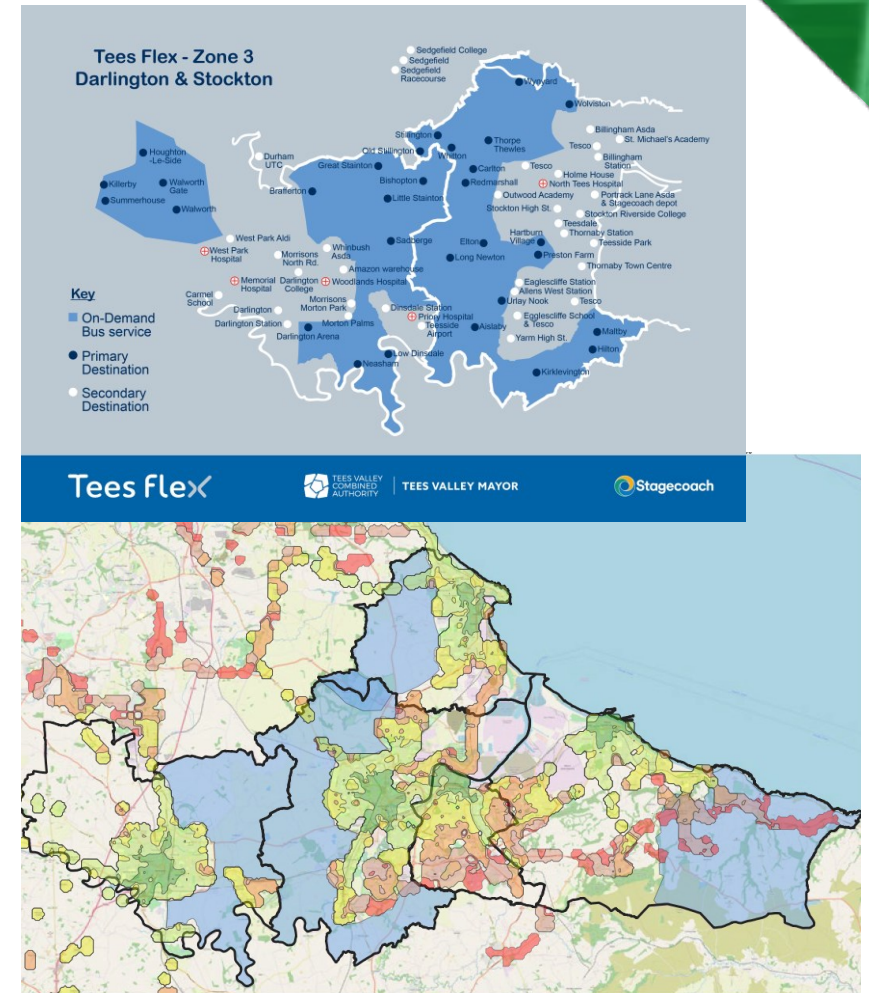
Consider flexible services as part of core public transport network

70%

Think flexible services should be in scope of BOD project

80%

Not currently providing flexible services data in BODS platform



Definition – Many Variants

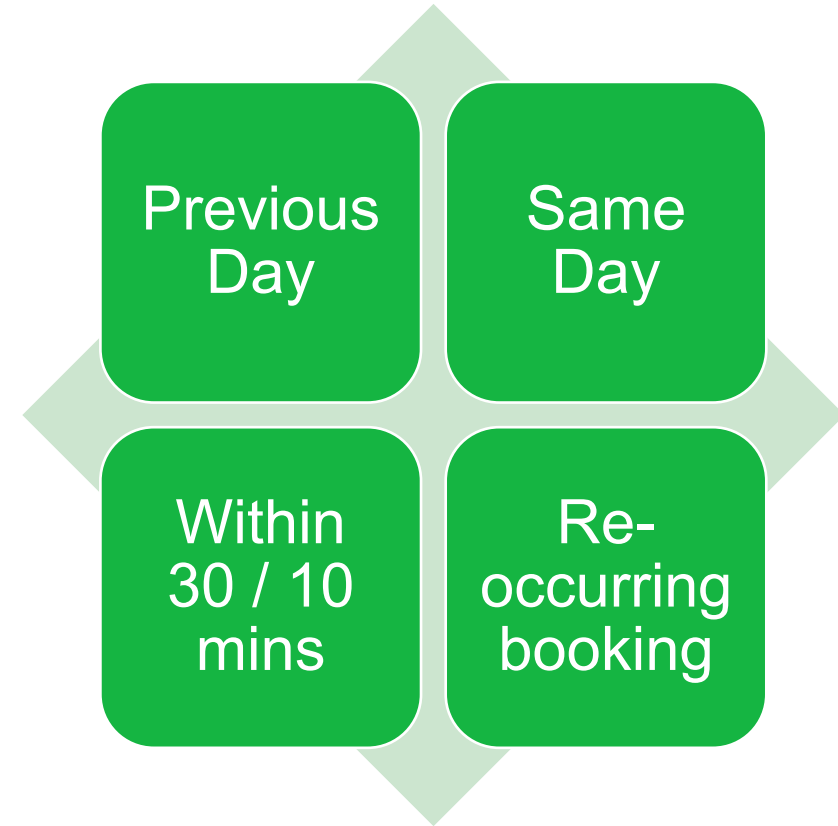
- Flexible Service
- Demand responsive
- Dial a ride
- On Demand
- Flexibus
- Uber style

- Part fixed, part flexible
- Fixed route, run on demand
- Route and timetable flexible



Advance Booking

- **Register in advance**
— Prove a need?
- **Phone**
- **Email**
- **Web**
- **App**
- **Previous & Current driver**



BODS Problem

- **Lack of agreed approach**
- **Multiple approaches e.g**
- **Sample / notional timetable with notes**
 - `<NoteText>`Times are notional ***MUST BE BOOKED*** in advance. Phone XXX.`</NoteText>`
 - `<NoteText>`Most times are approximate.`</NoteText>`
 - `<NoteText>`Must pre-book in advance (XXXX)`</NoteText>`
- **Notes often not presented**
- **Journey planners use timetable as though it is fixed.**

Definition of Flexible Bus Service for BODS support

- **Registerable with Traffic Commissioner as a flexible service**
- **Most DRT or other service types will be supported**
 - Many variations so maybe some not supported.
 - Consultation may identify some unsupported that need including.
 - May be some types not possible to support.

Data Requirement

- Simple as possible
- Area covered (stops or zone)
- When it operates
- How to book



Welcome to Tees Flex!

Your all-new, on-demand bus service now available in Tees Valley.

Another day at the office? Heading into sixth form? A spot of retail therapy or enjoying a coffee with friends?

From 24 February 2020, Tees Flex services will operate from 7am to 8pm (Monday to Saturday).

Download the Tees Flex app and plan your first journey with us!

Brought to you by Stagecoach in partnership with the Tees Valley Mayor and Combined Authority.



Download the FREE Tees Flex App

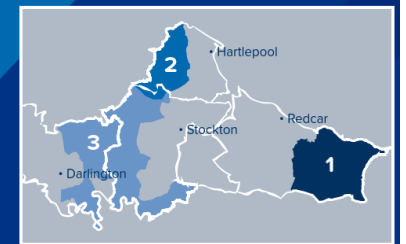


Powered by VIA VAN

Where can I travel with Tees Flex?

Tees Flex bus services are available in these three areas:

Zone 1	Redcar & Cleveland
Zone 2	Hartlepool
Zone 3	Stockton & Darlington



Please note: Customers can travel between two points within a single zone but not between zones. You're also able to travel to a range of predefined locations outside your local area, see stagecoachbus.com/teesflex for details.



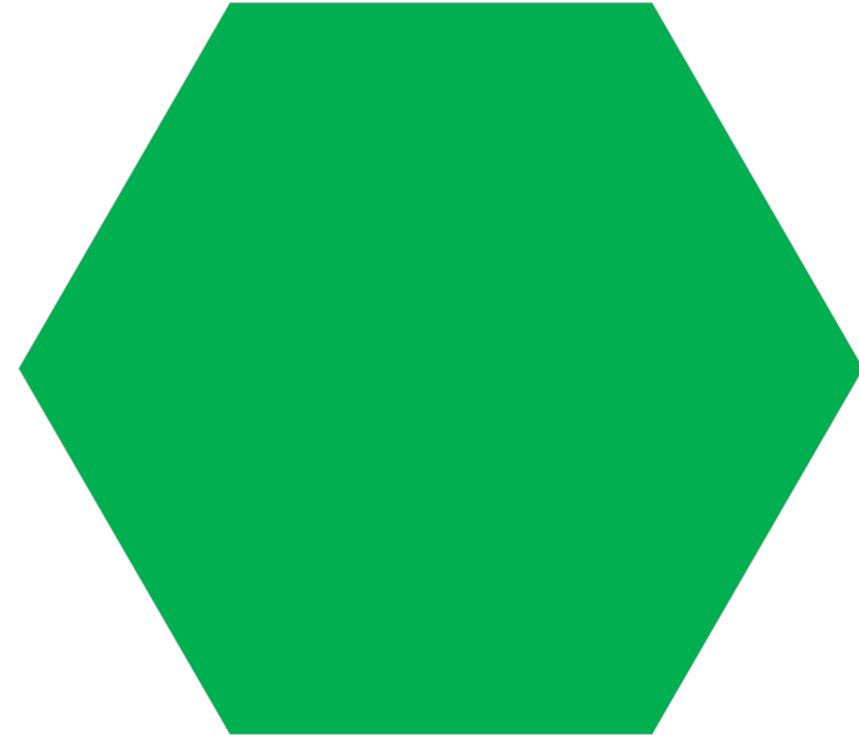
Other data sets

- **Location data**
 - No current plans to expect AVL for flexible services to be provided
- **Fares**
 - Supported by Fares work.

Service Type Support

Flexible Zone

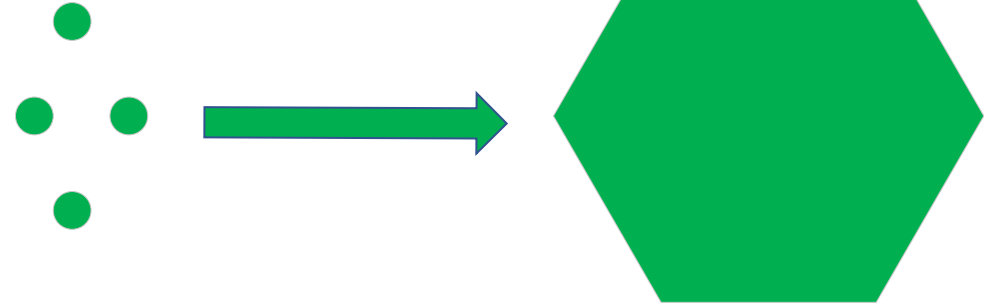
- Any location to any location



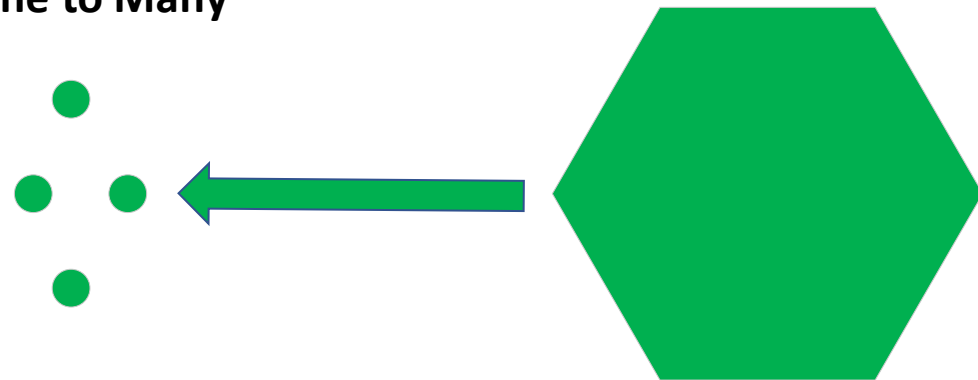
Many to One

- **Defined locations**
- Bus Stops or other location
- **Zones**
- i.e. from anywhere in village to train station

Many to One

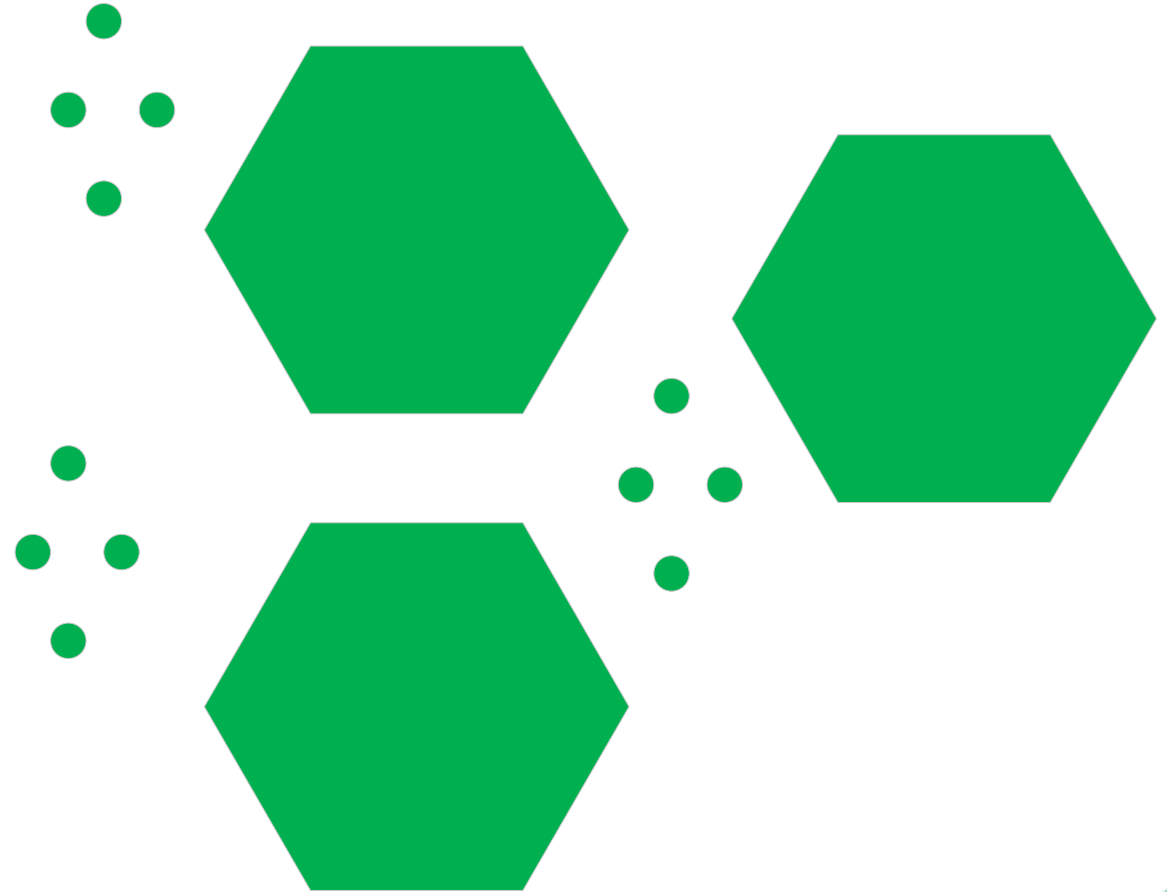


One to Many

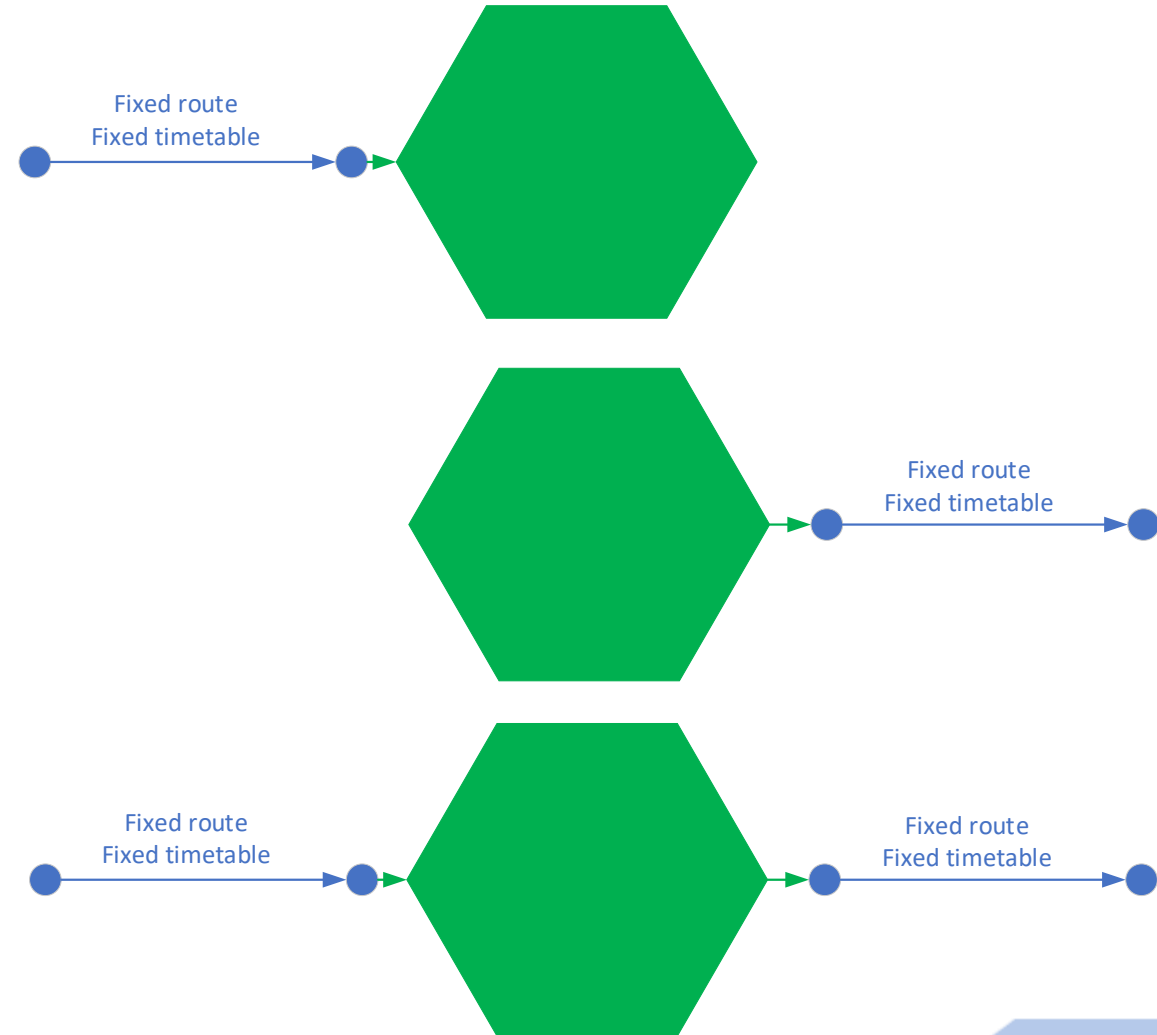


Any to Any

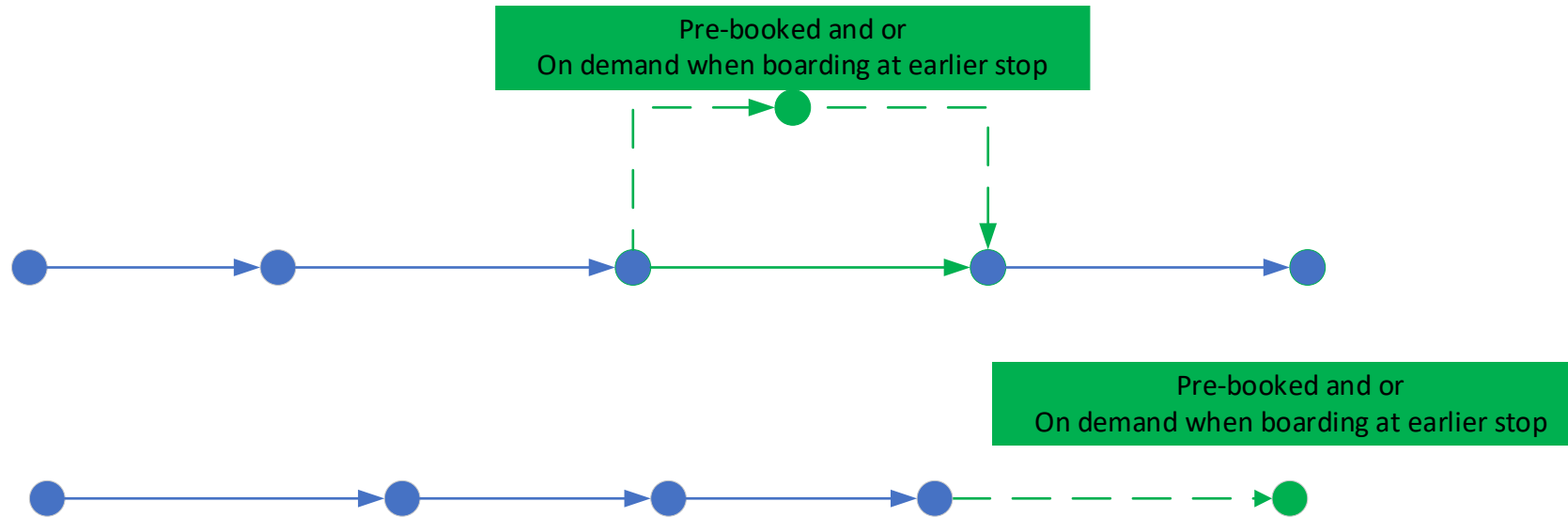
- Fixed locations
- Zone
- Any order or direction



Mixed fixed and flexible



On demand stops **



- ** Proposal to allow these to be managed differently

Technical Profile

- Adds to the BODS PTI-TXC Profile
- The content replaces Chapter 10 of the TXC-PTI profile document and will be included in any updated profile document.
- Standalone until v1.2 published
- Provides system suppliers with technical details of how data should be provided.

1 Flexible Bus Services

v0-1 28 April 2023
v0-2 17 May 2023, following BODS project team review
v0-3 23 May 2023, released for consultation.
v0-4 27 June 2023, following consultation.
v1-0 31 July 2023, Published version.
v1-0-1 5 September 2023, update OTH to otherPoint

The content in this document replaces Chapter 10 of the TXC-PTI profile document and will be included in v1.2 of the profile.

1.1 Background

There are a multitude of approaches to the specification and promotion of flexible bus services unlike fixed route and timetable services where there are fewer opportunities for divergence from a common approach.

This section sets out how the majority of flexible bus services registered as flexibly routed with the OTC can be specified within a BODS compliant manner, enabling data to be provided to BODS and for data consumers to present data in a manner that the operator would expect. The Services supported:

- Do not have a fixed timetable.
- Have a route which may be determined by the requests made by passengers.
- Include those where passengers may need to book in advance of using the service.
- Are open to anyone who lives in the area where the services operate.

A flexible bus service will use spatial zones or lists of fixed stops but do not have a fixed order of stops and or a timetable published in advance. This allows for flexible services to have combinations of

- area-to-fixed stop,
- area-to-area,
- fixed stop-to-fixed stop with no fixed timetable
- fixed stop-to-fixed stop with no pre-defined route.

Within a zone there does not have to be fixed or marked stop(s) and in these situations the service will call on demand at a location agreed during the booking process.

Both zones and fixed stop points use the requisite NaPTAN stop types which need to be defined in NaPTAN in advance of submission to BODS.

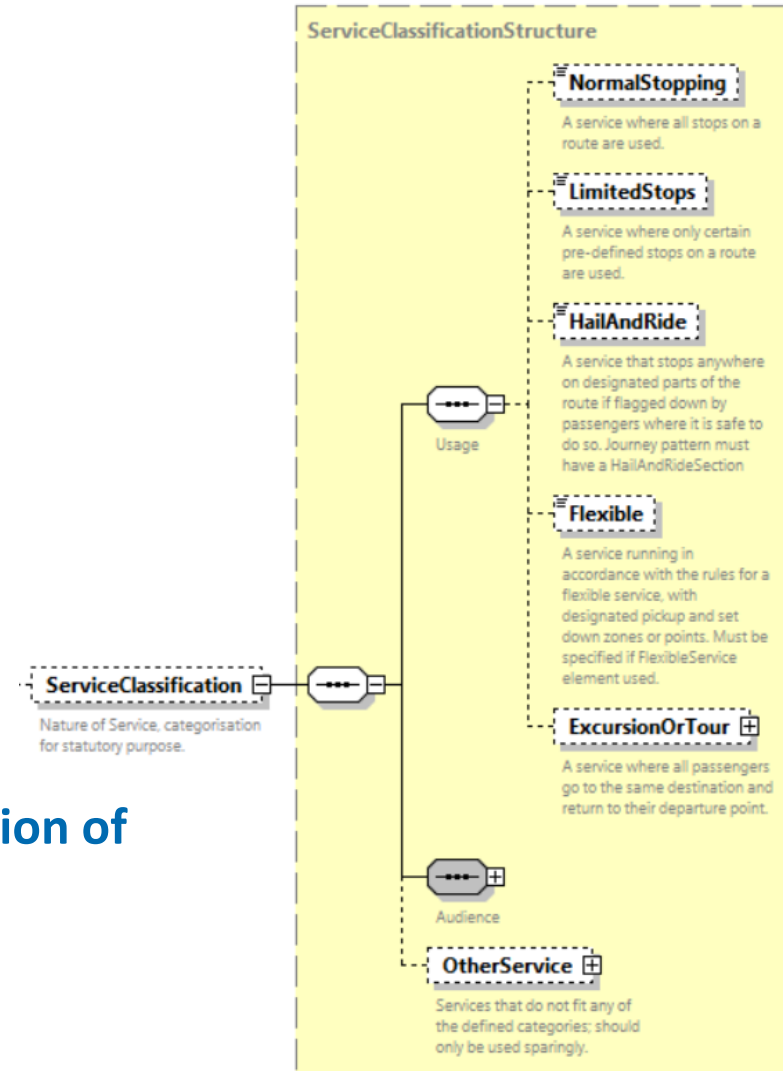
1.2 Declaring a flexible service

TXC-PTI Profile Flexible Bus Services v1-0-1

Profile Requirements

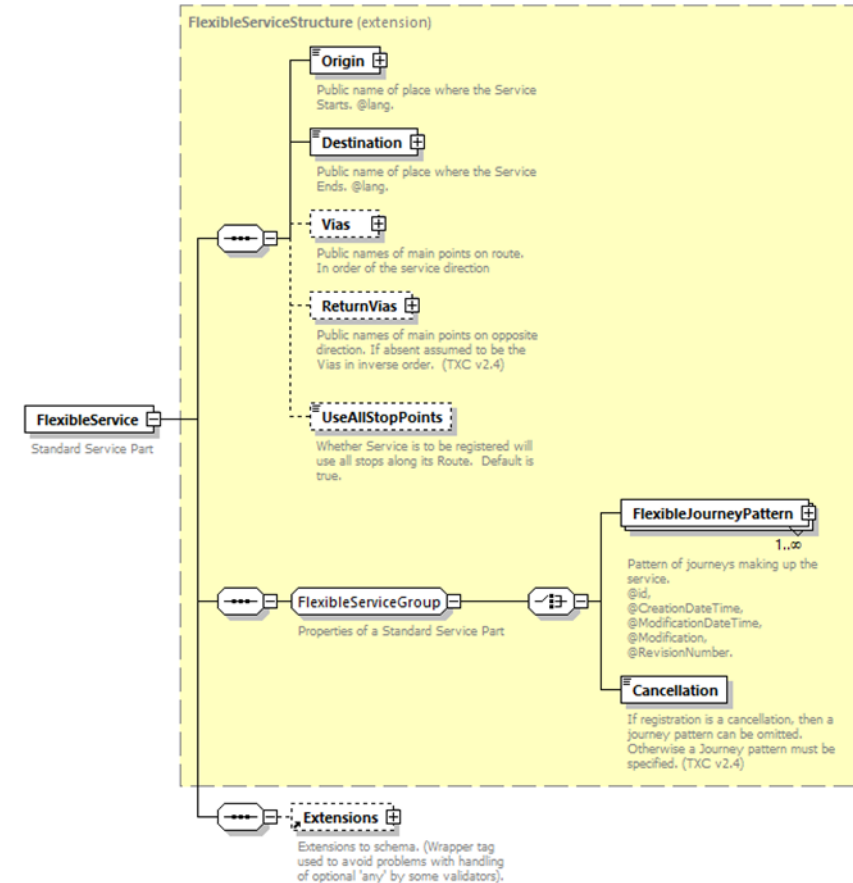
Service Classification

- A FlexibleService is essentially a StandardService,
- Forms part of the Service, generally replacing the StandardService.
- It is possible for a single service to contain both StandardService and FlexibleService components.
- A FlexibleService is required to have the ServiceClassification of type Flexible

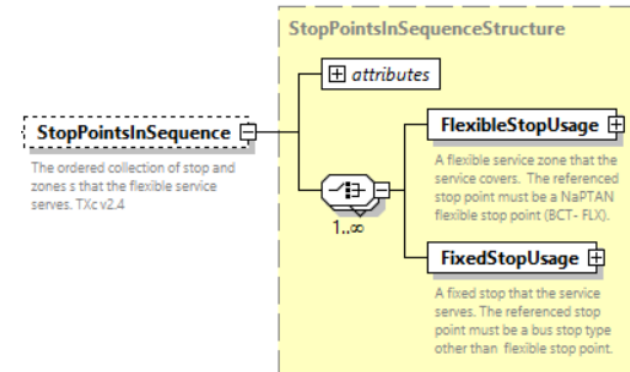
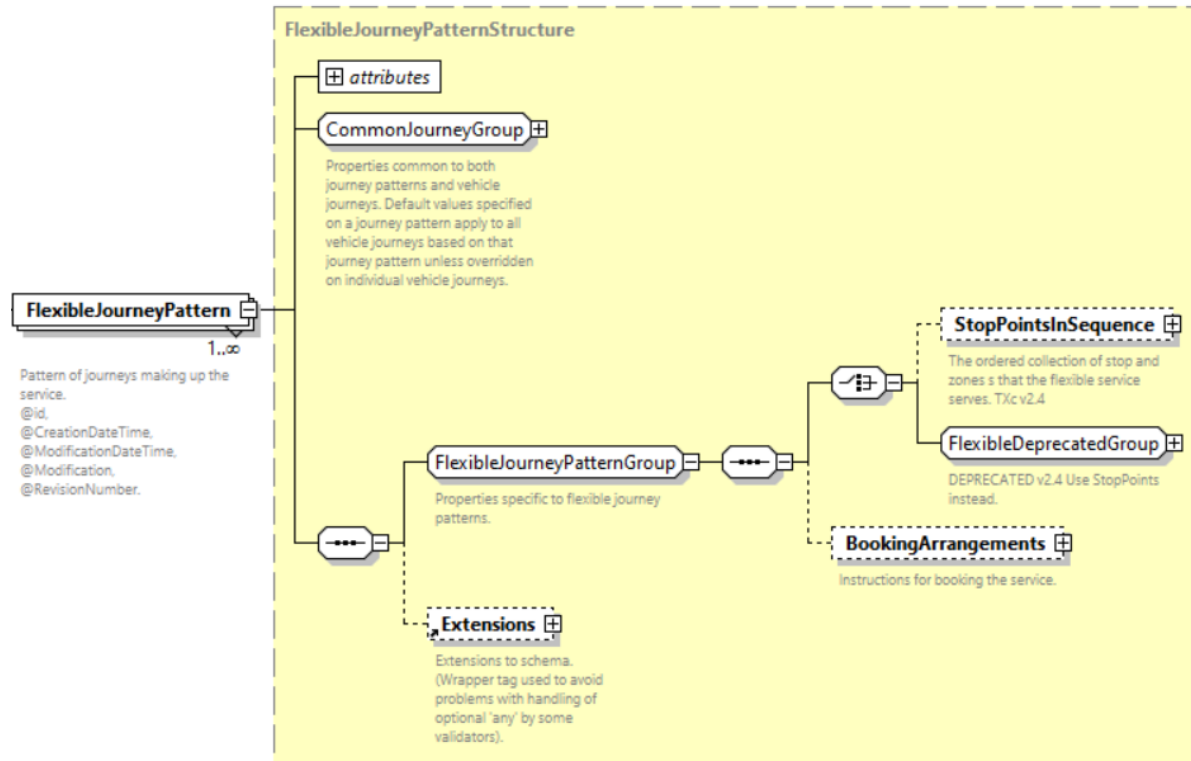


Flexible Service Structure

- Similar to standard service types
- At least one FlexibleJourneyPattern



Flexible Journey Patterns



- Older version of TXC used **FlexibleZone** and **FixedStopPoints**. These are **Deprecated** and **NOT** used.

Single Zone

```
<FlexibleJourneyPattern id="jp_1">
  <Direction>outbound</Direction>
  <StopPointsInSequence>
    <FlexibleStopUsage>
      <!-- Atterby -->
      <StopPointRef>270002700155</StopPointRef>
    </FlexibleStopUsage>
  </StopPointsInSequence>
  <BookingArrangements>
    ...
  </BookingArrangements>
</FlexibleJourneyPattern>
```



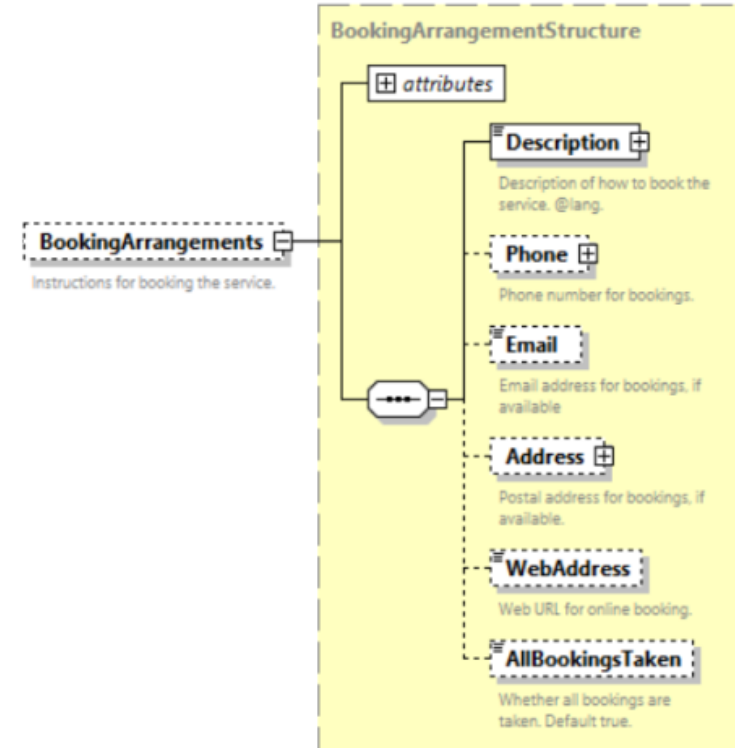
Sequences

- **Sequence 1 & 2**
- Fixed points
- **Sequence 3**
- Flexible zone
- **Sequence 4**
- Fixed point

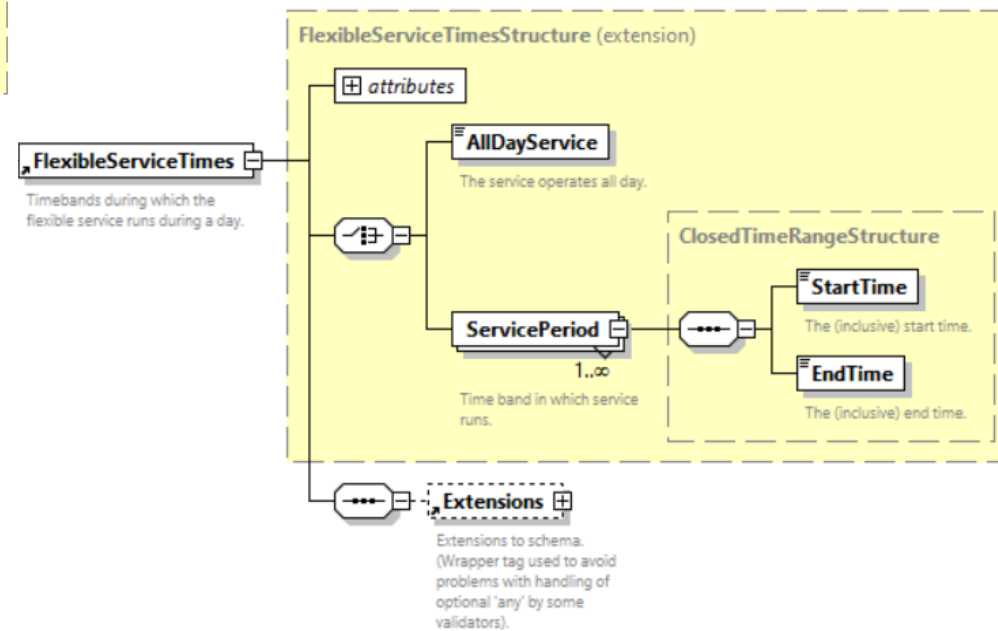
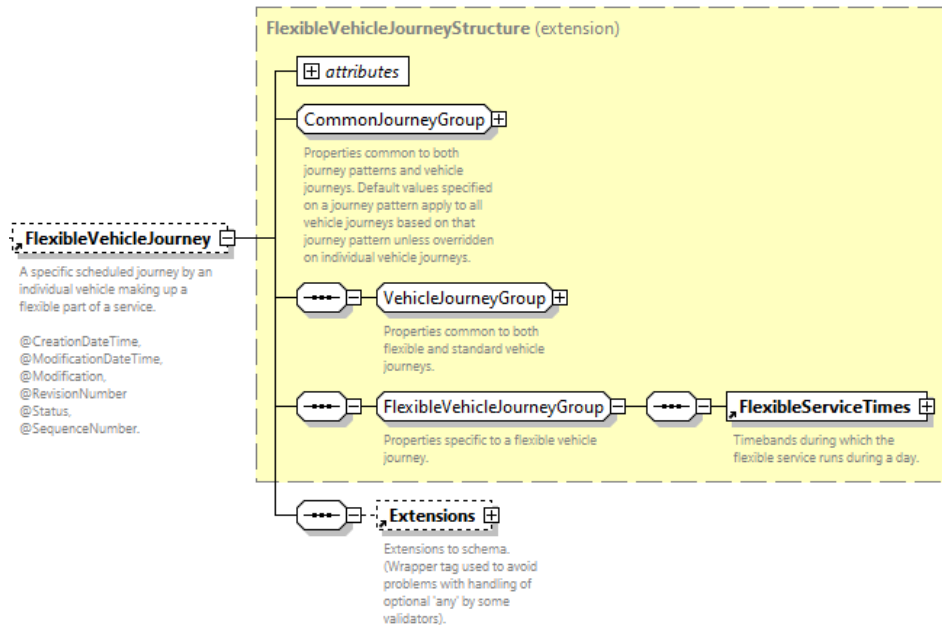
```
<StopPointsInSequence>
  <FixedStopUsage SequenceNumber="1">
    <!-- Washingborough Shop -->
    <StopPointRef>0600000102</StopPointRef>
    <TimingStatus>otherPoint</TimingStatus>
  </FixedStopUsage>
  <FixedStopUsage SequenceNumber="2">
    <!-- Washingborough Church -->
    <StopPointRef>0600000101</StopPointRef>
    <TimingStatus>otherPoint</TimingStatus>
  </FixedStopUsage>
  <FlexibleStopUsage SequenceNumber="3">
    <!--- Nettleham-->
    <Activity>pickUpAndSetDown</Activity>
    <StopPointRef>0600000201</StopPointRef>
  </FlexibleStopUsage>
  <FixedStopUsage SequenceNumber="4">
    <!-- Heighington -->
    <StopPointRef>0600000103</StopPointRef>
    <TimingStatus>otherPoint</TimingStatus>
  </FixedStopUsage>
</StopPointsInSequence>
```


Booking Arrangements

Element Name	Data Type	Used in TXC-PTI
Description	NaturalLanguageString	Required
Phone	TelephoneContactStructure	Optional, one of Phone, Email, Address or WebAddress is required by BODS
Email	EmailAddressType	Optional, one of Phone, Email, Address or WebAddress is required by BODS
Address	PostalAddressStructure	Optional, one of Phone, Email, Address or WebAddress is required by BODS
WebAddress	anyURI	Optional, one of Phone, Email, Address or WebAddress is required by BODS
AllBookingsTaken	Boolean	Default is true



Flexible Vehicle Journey

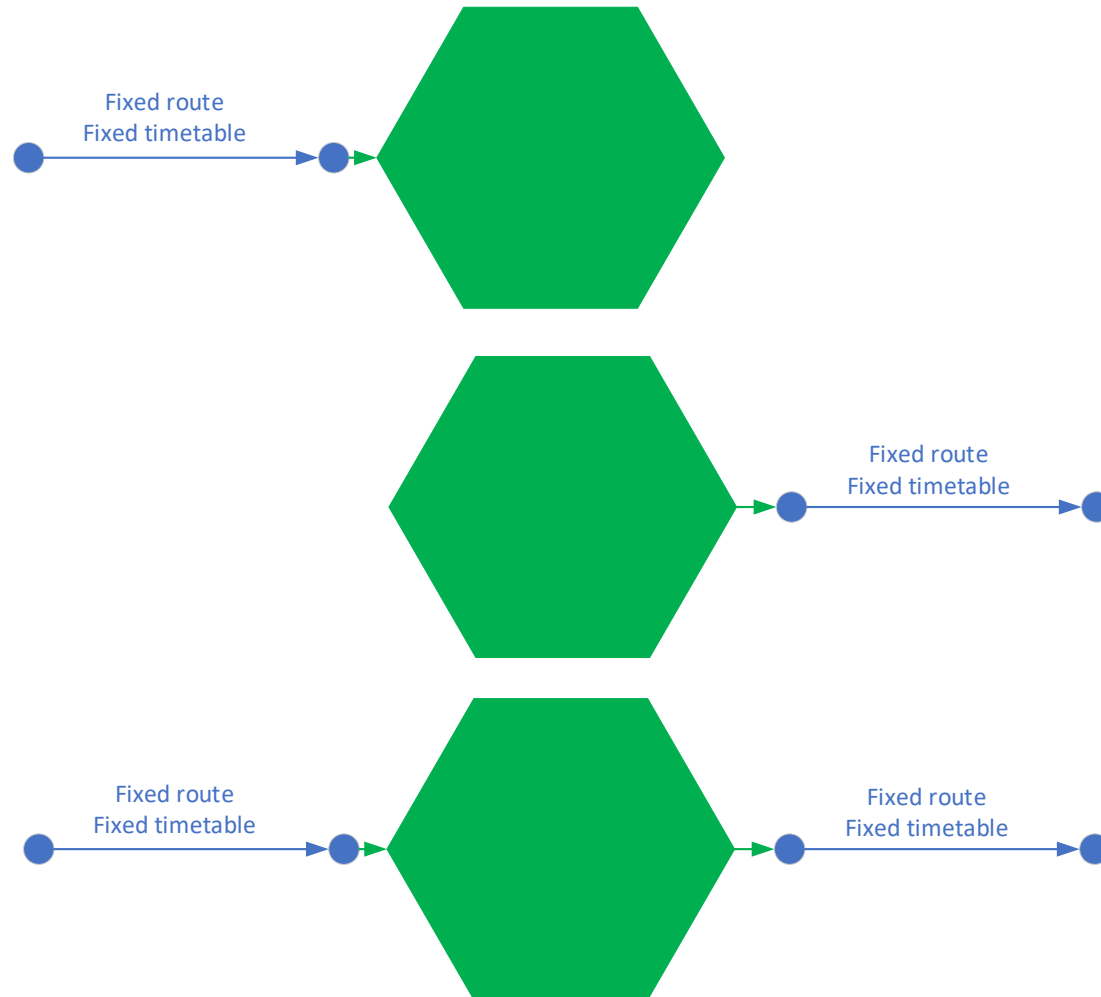


Mixed Fixed and flexible



Mixed fixed and flexible

- Fixed timetable as normal
- Flexible zone as normal
- Link fixed and flexible using interchange



GRANTHAM - STAMFORD

CallConnect 4

Timetable effective from 01 August 2022

Monday to Saturday

	Sch	SH	S	NS	NS	S	S	NS	NS
Grantham, Bus Station	0700	0700	...	...	1000	1015	1315	1330	...
Grantham, Prince William Barracks	0706	0706	...	...	1006	1021	1321	1336	...
Old Somerby, Fox & Hounds	0709	0709	...	...	1009	1024	1324	1339	...
Boothby Pagnell, Letter Box	0712	0712	...	...	1012	1027	1327	1342	...
Bitchfield, The Crown	0716	0716	...	...	1016	1031	1331	1346	...
Burton le Coggles, Demand Responsive Area	R	R	...	...	R	R	R	R	...
Swayfield, Demand Responsive Area	\	\	\	R	\	\	\	\	...
Corby Glen, Fighting Cocks Inn	0722	0722	0752	0928	1022	1037	1337	1352	1603
Swinstead, Croake Hill	0726	0726	0756	0932	1026	1041	1341	1356	1607
Creton, Couthorpe Road	0730	0730	0800	0936	1030	1045	1345	1400	1611
Little Bytham, The Mallard	0733	0733	0803	0939	1033	1048	1348	1403	1614
Castle Bytham, Castle Inn	0740	0740	0810	0946	\	1055	1355	1410	1621
Holywell, Home Farm House	0744	0744	0814	0950	\	1059	1359	1414	1625
Careby, Station Road	0747	0747	0814	0953	1036	1102	1402	1417	1628
Carlby, Village Hall	0755	\	\	\	\	\	\	\	\
Essendine, Village Hall	0757	\	\	\	\	\	\	\	\
Ryhall, Coppice Road	0800	0754	0824	1000	1043	1109	1409	1424	1635
Stamford, Peterhouse Close	0810	\	\	\	\	\	\	\	\
Stamford, Rutland Road	0814	0759	0829	1005	1048	1114	1414	1429	1640
Stamford, Morrisons Car Park	\	0802	0832	1008	1051	1117	1417	1432	1643
Stamford, Bus Station [1]	0825	0809	0839	1015	1058	1124	1424	1439	1650

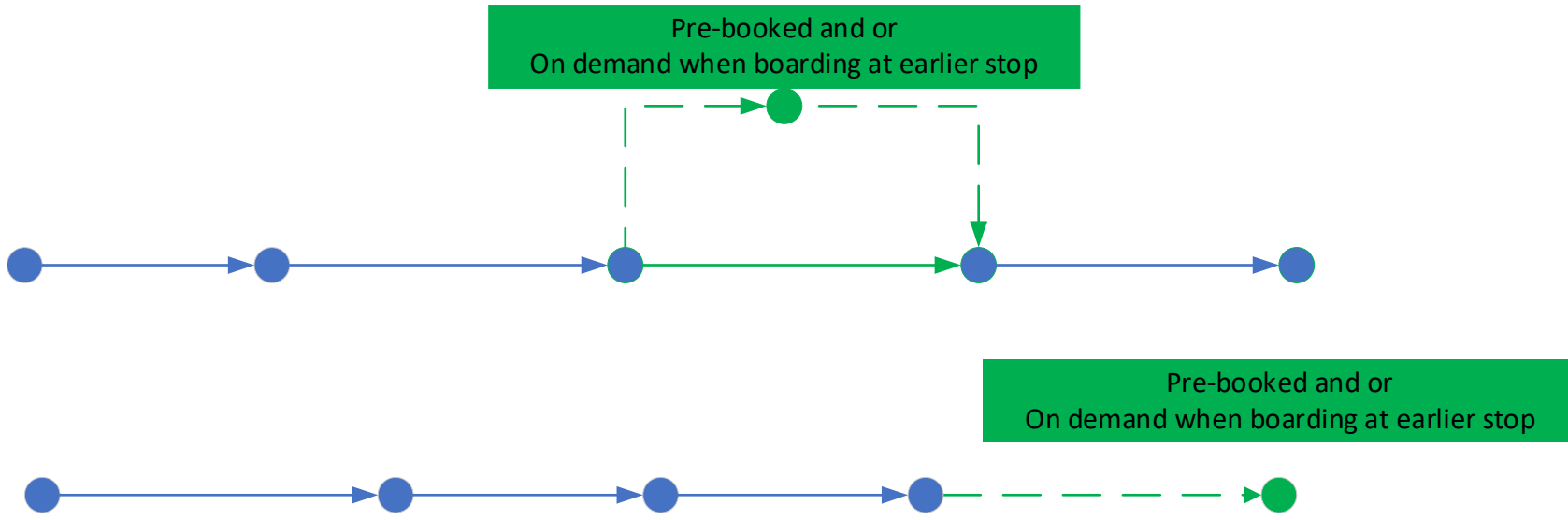
Code

R - "MUST BE BOOKED" more than 2 hrs in advance. Phone 0345 234 3344.

- SH - School Holidays
- Sch - Schooldays Only
- S - Saturdays only
- NS - Not Saturdays

On demand stops

For passengers on
vehicle



Current approach to TXC Coding

```
<JourneyPatternTimingLink id="JPL_47-99-_-y10-2-25-0-62-50">
  <From SequenceNumber="50">
    <Activity>pickUpAndSetDown</Activity>
    <StopPointRef>4600WIA11258</StopPointRef>
    <TimingStatus>OTH</TimingStatus>
  </From>
  <To SequenceNumber="54">
    <Activity>setDown</Activity>
    <Notes>
      <Note>
        <NoteCode>R</NoteCode>
        <NoteText>Sets down by request to driver only</NoteText>
      </Note>
    </Notes>
    <StopPointRef>4600WIA11266</StopPointRef>
    <TimingStatus>PTP</TimingStatus>
  </To>
  <RouteLinkRef>RL_47-99-_-y10-2-0-62-50</RouteLinkRef>
  <RunTime>PT3M8S</RunTime>
</JourneyPatternTimingLink>
```


2.5 Notes

Notes are permitted in various places in TXC-PTI and follow the same structure as in a standard TXC document.

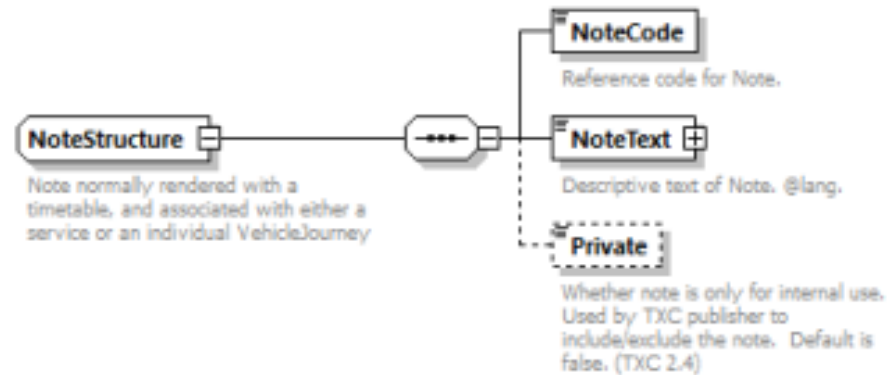


Figure 6 - The Note structure

There are no specific requirements for notes that arise within TXC-PTI, except that:

- notes should not be flagged as private; and
- notes should not encapsulate anything in a text format that is best described through data. This is because consuming systems cannot process textual data without a high degree of effort.

An example of an inappropriate note might include, for example, "Starts 3 minutes earlier at Cefn Coch Inn", as this should be encoded with suitable stop and timing records.



For TXC-PTI, **Notes** are optional.



For TXC-PTI, where **Notes** are used, then these shall not encapsulate information that is best described through data.



Issue

- Data consumers don't honour "setDown"
- Notes not presented
- **GTFS cannot translate setDown in stop_times.txt as not sufficient data**
- pickup_type=1
- drop_off_type=3

pickup_type	Enum	Optional	Indicates pickup method. Valid options are: 0 or empty - Regularly scheduled pickup. 1 - No pickup available. 2 - Must phone agency to arrange pickup. 3 - Must coordinate with driver to arrange pickup.
drop_off_type	Enum	Optional	Indicates drop off method. Valid options are: 0 or empty - Regularly scheduled drop off. 1 - No drop off available. 2 - Must phone agency to arrange drop off. 3 - Must coordinate with driver to arrange drop off.

Resolution

- Specify FlexibleJourneyPattern for section.
- Overkill for single stops
- Update TxC **schema** - TXC_journey_support.XSD to have additional activities

```
<xsd:simpleType name="VehicleAtStopActivityEnumeration">
  <xsd:annotation>
    <xsd:documentation>Activity undertaken by vehicle at a stop.</xsd:documentation>
  </xsd:annotation>
  <xsd:restriction base="xsd:NMTOKEN">
    <xsd:enumeration value="pickUp"/>
    <xsd:enumeration value="setDown"/>
    <xsd:enumeration value="pickUpAndSetDown"/>
    <xsd:enumeration value="pass"/>
    <!-- ===equivalent of GTFS pickup_type 3 ===== -->
    <xsd:enumeration value="pickUpDriverRequest"/>
    <!-- ===equivalent of GTFS drop_off_type 3 ===== -->
    <xsd:enumeration value="setDownDriverRequest"/>
    <xsd:enumeration value="pickUpAndSetDownDriverRequest"/>
  </xsd:restriction>
</xsd:simpleType>
```

- **NOTE:** *pickUpAndSetDownDriverRequest* added following consultation.
- Plus education of data consumers to use “Activity”

Next Steps



Adoption Challenges

- **Format not widely implemented**
 - Few systems currently can produce the flexible service outputs
 - Few data consumers can use the data
- **Flexible zone stop type not in place for all services**
 - Education of authorities.
 - Lots of FLX stops will need to be created by authorities
 - Working with NaPTAN team – recent session on FLX

BODS Development

- **UX design underway**
- UI screen designs created and prototype iteratively tested, to enhance BODS
- **Validation design**
- Design to handle and test flexible service data requirements underway.
- **Timescales**
- Under discussion
- Expect new data in correct format from early 2024

Service - FD12345

Overview of the available bus open data

Name Arriva_Gulford_Woking_2019-04-30

Service code FD12345

Earliest start date XXXXXX

Earliest end date XXXXXX

Service organisation Name St Johns School

Service organisation 070122 - 01/05/22
01/08/22 - 01/12/22

Line number	Days of operation
3 - Norwich - Watton	Monday, Wednesday, Sunday
3A - Watton - Dereham	Monday, Tuesday, Wednesday, Sunday
5 - Watton - Coleman	Monday, Tuesday, Friday

Flexible service - FD12345

Overview of the available bus open data

Name Arriva_Gulford_Woking_2019-04-30

Service code FD12345

Towns served Huddersfield, Leeds, Preston, Liverpool, Blackpool

Operating periods XXXXXX

Service name XXXXXX

Line numbers

Show all sections

3 - Norwich - Watton

Hide

Days of operation Monday, Tuesday, Saturday, Sunday

Zones used 300

Booking window Monday - Sunday, 0900 - 1800

Overall hours of operation Monday - Sunday, 0600 - 2200

Booking methods [Link to book](#)
[Link 2 to book](#)
[iBus-App](#)

3A - Watton - Dereham

Show

Noticed issues with this data set?
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More Information

- Will be on BODS web pages.
- **PTIC website:**
- https://www.pti.org.uk/flexible_bus_services_BODS

Thank You

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