Department for Transport

Title	Digital Traffic Regulation Orders: D-TRO Beta Validation Rules Documentation
Author(s)	D-TRO Technical Team
Date	31 March 2025
Version	3.4.0
Status	Draft
Protective Marking	OFFICIAL

1. Document Control

1.1 Version History

Version	Author	Summary of changes	Date
3.2.4	PA Consulting	Additional validation rules removed from and changed in notification of objects for Beta updates to data model	October 2024
3.3.1	PA Consulting	Additional validation rules added	20 January 2025
3.4.0	PA Consulting	Implementation of schema validation	31 March 2025

1.2 Document Review

Version	Reviewer(s)	Date
3.2.4	Jon Harrod Booth (Harrod Booth Consulting, for the Department for Transport)	October 2024
3.3.1	Jon Harrod Booth (Harrod Booth Consulting, for the Department for Transport)	20 January 2025
3.4.0	Jon Harrod Booth (Harrod Booth Consulting, for the Department for Transport)	31 March 2025

1.3 Approved Versions

Version	Approver(s)	Date
3.2.4	John Cooper (Department for Transport, Product Owner)	October 2024
3.3.1	John Cooper (Department for Transport, Product Owner)	20 January 2025
3.4.0	John Cooper (Department for Transport, Product Owner)	31 March 2025

Contents

2. Terms and Abbreviations

Term / Abbreviation	Definition
D-TRO	Digital Traffic Regulation Order
DfT	Department for Transport
DSP	Digital Solution Provider
TRA	Traffic Regulation Authority
ICD	Interface Control Document
SWA	Street Works Act (SWA) codes

3. Introduction

Britain is on the verge of a transport revolution and the Department has recently delivered the Future of Mobility, Urban Strategy as part of the Future of Mobility Grand Challenge. The Strategy prioritises providing a regulatory framework that evolves with transport technology and advocates data sharing to improve operation of the transport system.

Traffic Regulation Orders (TROs) are the legal orders made under the Road Traffic Regulation Act 1984 which define the rules of the road network. They currently provide Traffic Regulation Authorities with powers to place permanent, temporary, or experimental restrictions on traffic for the purposes of safety or traffic management. Orders therefore provide a vital mechanism for enforcement on the road network. Digitisation of these orders and providing them as standardised data would provide many benefits, including: (1) improving existing services (e.g., satnav routing); (2) providing new services; (3) reducing enforcement and processing costs to highway authorities; (4) reducing congestion; and (5) provision of the digital infrastructure for connected and automated vehicles.

The Automated Vehicles Act 2024 (section 93) provides the capability for the Secretary of State, through regulation, to require Traffic Regulation Authorities (TRAs) to provide information on a defined set of Traffic Regulation Measures, in a specified manner and form, to be provided in accordance with a specified model, standard or set of specifications. These will be the D-TRO Data Specification including the D-TRO Data Model, and are expected to be specified under secondary legislation.

This document specifies the semantic validation rules that submitted D-TRO records will be executed against before acceptance into the central storage system.

4. Target Audience

The target audiences of this document include:

- Traffic Regulation Authorities (TRAs) and any Digital Solution Providers that currently manage IT contracts within the authority.
- The D-TRO Service Owner who will be responsible for long-term support, maintenance, and continual improvement of the Service.

5. Validation approach

Schema validation

Schema validation ensures that submitted D-TROs align with the data model. Schema validation is executed at the time of submission. The current version of the schema can be found within the D-TRO Beta GitHub repository: https://github.com/department-for-transport-public/D-TRO.

The purpose of schema validation is to validate that a submitted payload conforms to all the rules outlined within the schema. This includes, but is not limited to, the following:

- All submitted property names match the naming convention
- Required properties are present
- Additional submitted properties not outlined in the schema are forbidden
- Data types are correct
- Values are one of a fixed enumeration, where required
- Numeric values are within a given range
- Strings are of a minimum/maximum length
- Arrays have a minimum/maximum number of items
- Values match expected formats/patterns, e.g. date formats, datetime formats
- Conditional logic, e.g. when a property has a certain value, this property must/must not exist

Schema validation is implemented with Newtonsoft (https://www.newtonsoft.com/json). Newtonsoft provides a useful online schema validation tool, providing the ability to interactively validate payloads against a schema. This can be found here: https://www.jsonschemavalidator.net/.

With the introduction of schema validation, there exists duplication of the validation rules across both schema and semantic validation. As part of future work, an audit will be performed to identify the semantic validation rules being applied that are now covered by schema validation, and work will be done to retire these from semantic validation. As schema validation cannot capture some of the more nuanced validation rules, such as validating a date is before or after a certain period of time, some level of semantic validation will still need to be performed.

Semantic validation

Semantic validation ensures that submitted D-TROs contain quality and representational data beyond alignment with the schema. Semantic validation is executed at the time of submission. The current version of the semantic validation rules can be found in section 7. Semantic validation is defined through three approaches. The first is to use JSON native validation where possible to validate ranges or types, through the use of schema validation (see above section). The second is to define more complex, dependent rules using JSON Logic (https://jsonlogic.com/). These

rules are defined using the JSON logic syntax and are created under a semantically versioned ruleset. Finally, any more complex rules are defined within the D-TRO service codebase.

Validation strategy for supporting multiple versions

When a D-TRO is submitted the request body must include a version of the data schema that the D-TRO is to be validated against. There is a relationship between the schema version number and a semantic rules version number document. As semantic validation rules are defined in section 7, they are assigned an 'introduced in version' number showing which version they are applied to, therefore any D-TRO submitted with the corresponding schema version will be validated against that versions ruleset and any lower versions ruleset. If a D-TRO is submitted against one version of the schema and semantic rules, future updates can be made against the version of the schema it was originally submitted against. Updates can also be submitted against a higher version of the schema and rules and will be accepted against the higher version if validation is successful.

6. Assumptions, Constraints, Risks and Dependencies

ID	Scenario	Impact
01	D-TRO maintains the D-TRO user code list, which is synchronised with the SWA code list, where the user exists in the SWA code list. The SWA code list used is maintained externally by GeoPlace (link here) so may change without notice.	A change to the SWA code list may render previously accepted records or D-TRO user codes invalid if an update is attempted if the code changes.
02	DfT may not be aware of the association between a TRA and a DSP.	Records may be rejected if a system is not in place for TRAs to nominate DSPs to provide their data.

7. Semantic validation rules

Current Applicable rules

Rule ID	Applicable Data Field	Secondary data field(s)	Rule Definition	Introduced in Version	Error Message "name"	Error Message "message"	Error Message "rule"
1.	source.actionType		Each instance shall be unique and one of these values: "new", "amendment", "noChange", "errorFix" Note: this is a subset of the actionType list.	3.2.1	Invalid 'actionType'	Indicates the nature of update between D-TRO records or their constituent parts	Source 'actionType' must contain one of the following accepted values: 'new,amendment,noChange,errorFix'
2.	source.currentTraOwner		This must be an integer, and numeric value of the integer must match an entry in the D-TRO user code list.	3.2.2	Invalid 'Current Traffic regulation authority current owner'	Current Traffic regulation authority maintaining this D-TRO (SWA-like code)	Current TRA must be a valid SWA-like code and known to the D-TRO Service; the TRA code must correspond with the appropriate App-ID
3.	source.reference		This must be a non-null string.	3.2.0	Invalid 'reference'	Indicates a reference to the relevant part or section of the TRO	Source 'reference' must be of type 'System.String' and be non-null.

Rule ID	Applicable Data Field	Secondary data field(s)	Rule Definition	Introduced in Version	Error Message "name"	Error Message "message"	Error Message "rule"
4.	source.section		This must be a non-null string.	3.2.0	Invalid 'section'	Reference to the section of the D-TRO	Source 'section' must be of type 'System.String' and be non-null.
5.	source.traAffected		This must be an array of integers, comma separated, and numeric value(s) must match an entry in the D-TRO user code list.	3.2.3	Invalid 'traAffected'	Traffic regulation authorities who roads are affected by this D-TRO	TRA affected must be a valid SWA-like code and known to the D-TRO Service; the TRA
6.	source.traCreator		This must be an integer, and numeric value must match an entry in the D-TRO user code list.	3.2.2	Invalid 'traCreator'	Traffic regulation authority originally creating this D-TRO (SWA-like code)	TRA creator must be a valid SWA-like code and known to the D-TRO Service; the TRA
7.	source.troName		This must be a non-null string with a descriptor name for the TRO.	3.2.0	Invalid 'troName'	Traffic regulation order published title	Source 'troName' must be of type 'System.String' and be non-null. 'troName' need to be meaningful (i.e. in the form given in the legal order)

Rule ID	Applicable Data Field	Secondary data field(s)	Rule Definition	Introduced in Version	Error Message “name”	Error Message “message”	Error Message “rule”
8.	provision.actionType		This must be of type “string” and these values have been modified: “new”, “amendment”, “fullRevoke”, “partialRevoke”, “fullAmendment”, “partialAmendment”, “noChange”, “errorFix”	3.3.0	Invalid 'actionType'	Indicates the nature of update of a Provision	Provision 'actionType' must contain one of the following accepted values: 'new,partialAmendment,fullAmendment,partialRevoke,fullRevoke,noChange,errorFix'
9.	provision.orderReportingPoint		Shall be one of: “experimentalAmendment”, “experimentalMakingPermanent”, “experimentalNoticeOfMaking”, “experimentalRevocation”, “permanentAmendment”, “permanentNoticeOfMaking”, “permanentNoticeOfProposal”, “permanentRevocation”, “specialEventOrderNoticeOfMaking”, “ttroTtmoByNotice”, “ttroTtmoExtension”, “ttroTtmoNoticeAfterMaking”, “ttroTtmoNoticeOfIntention”, “ttroTtmoRevocation”, “variationNotice" “troOnRoadActiveStatus"	3.3.0	Invalid order reporting point	Attribute identifying the lifecycle point and nature of a Provision	'orderReportingPoint' must be one of 'experimentalAmendment,experimentalMakingPermanent,experimentalNoticeOfMaking,experimentalRevocation,permanentAmendment,permanentNoticeOfMaking,permanentNoticeOfProposal,permanentRevocation,specialEventOrderNoticeOfMaking,ttroTtmoByNotice,ttroTtmoExtension,ttroTtmoNoticeAfterMaking,ttroTtmoNoticeOfIntention,ttroTtmoRevocation,variationByNotice,troOnRoadActiveStatus'

Rule ID	Applicable Data Field	Secondary data field(s)	Rule Definition	Introduced in Version	Error Message "name"	Error Message "message"	Error Message "rule"
10.	provision.provisionDescription		This must be a non-null string.	3.2.0	Invalid description	Free text description of the referenced provision	Provision 'provisionDescription' must be of type 'System.String' and be non-null.
11.	provision.reference		This must be a non-null string.	3.2.0	Invalid reference	Indicates a system reference to the relevant Provision of the TRO	Each provision 'reference' must be unique and of type 'System.String' and be non-null.
12.	regulatedPlace.description		This must be a non-null string.	3.2.0	Invalid regulated place description	Free text description of the regulated place	Provision 'description' must be of type 'System.String' and be non-null.
13.	regulatedPlace.type		This must be of type "string" and one of these values: "regulationLocation", "diversionRoute"	3.3.0	Regulate place type	Regulated place type missing or incorrect.	One of 'regulationLocation,diversionRoute' type(s) must be present.
14.	geometry.version		This must be an integer with the version number of the selected geometry.	3.2.0	Invalid geometry version	Version of geometry linked to a concrete instance of geometry	Version number must be an integer and cannot be '0'
15.	if geometry is pointGeometry	Use of pointGeometry	Value and usage must be consistent with WKT standards with one pair of coordinates.	3.2.3	Invalid coordinates	Geometry coordinates linked to 'PointGeometry'	Coordinates '...' are incorrect or not within Great Britain

Rule ID	Applicable Data Field	Secondary data field(s)	Rule Definition	Introduced in Version	Error Message “name”	Error Message “message”	Error Message “rule”
16.	pointGeometry.representation		This must be a string and one of the values: “centreLinePoint”, “trafficSignLocation”, “other”	3.3.1	Invalid representation	Indicates the nature of the point location for a point representation of a regulated place.	'representation' must be one of 'centreLinePoint,trafficSignLocation,other'
17.	if geometry is linearGeometry	Use of linearGeometry	Value and usage must be consistent with WKT standards with at least two pairs of coordinates.	3.2.3	Invalid geometry coordinates	Geometry grid linked to ‘DirectedLinear’	Coordinates ‘...’ are incorrect or not within Great Britain
18.	linearGeometry.direction		This must be a string and one of the values: “bidirectional”, “startToEnd”, “endToStart”	3.3.1	Invalid direction	Indicates the direction of the applicability of the referenced regulation.	'direction' must be one of 'bidirectional,startToEnd,endToStart'
19.	linearGeometry.lateralPosition		This must be a string and one of the values: “centreline”, “near”, “onKerb”, “far”	3.3.1	Invalid lateral position	Indicates the lateral position across a road of the linear representation of a regulated place.	'lateralPosition' value must be one of 'centreline,near,onKerb,far'
20.	linearGeometry.representation		This must be a string and one of the values: “linear”, “representingZone”	3.3.1	Invalid representation	Indicates the nature of the point location for a linear representation of a regulated place.	'representation'' value must be one of 'linear,representingZone'

Rule ID	Applicable Data Field	Secondary data field(s)	Rule Definition	Introduced in Version	Error Message “name”	Error Message “message”	Error Message “rule”
21.	if geometry is polygon	Use of polygon	Value and usage must be consistent with WKT standards with at least four pairs of coordinates.	3.2.3	Invalid coordinates	Indicates that the given coordinates are broadly appropriate	Coordinates '...' are incorrect or not within Great Britain
22.	if geometry is directedLinear	Use of directed Linear	Value and usage must be consistent with WKT standards with at least two pairs of coordinates.	3.2.3	Invalid coordinates	Indicates that the given coordinates are broadly appropriate	Coordinates '...' are incorrect or not within Great Britain
23.	Coordinate reference system (use of British National Grid Reference)	Use of any geometries	Needs to include prefix of “SRID=27700;…” to indicate use of the OSGB36 coordinate referencing system.	3.2.3	Invalid geometry grid	Geometry grid linked to 'PointGeometry' , ‘LinearGeometry’, ‘Polygon’ or ‘DirectedLinear’	The WKT string must start with “SRID=27700
24.	externalReference. lastUpdateDate		This must be a date in the past.	3.2.0	Invalid last update date	Indicates the date the USRN reference was last updated	'lastUpdateDate' must be of type 'System.DateTime', and shall not be in the future

Rule ID	Applicable Data Field	Secondary data field(s)	Rule Definition	Introduced in Version	Error Message “name”	Error Message “message”	Error Message “rule”
25.	uniqueStreetReferenceNumber.usrn		This must be an integer representing the ID of the Unique Street Reference Number that appears in the National Street Gazetteer.	3.2.0	Invalid USRN	One or more 'usrn' are invalid	'usrn' value should be between 0 and 99999999 and specified as an integer (no leading zeros). This shall correspond to a value found in the National Street Gazetteer
26.	elementaryStreetUnit.esu		This must be an integer representing the ID of the Elementary Street Unit that appears in the National Street Gazetteer	3.2.0	Invalid ESU id	One or more “esu” are invalid	'esu' value should follow the NSG DEC convention and be between 10,000,001 (8 digits) and 99,999,999,999,999 (14 digits) and specified as an integer (no leading zeros). This shall correspond to a value found in the National Street Gazetteer
27.	regulation.isDynamic		This must be a boolean (true or false)	3.3.1	Invalid ‘isDynamic’	Indicates if the regulation is dynamic in nature.	Regulation 'isDynamic' must be present and has to be 'true' or 'false'.
28.	regulation.timeZone		This must be a non-null string and in IANA format (e.g. Europe/London)	3.3.0	Regulation 'timeZone'	IANA time-zone (see http://www.iana.org/time-zones).	Regulation 'timeZone' must be of type 'string' and be non-null. Expected to default to "Europe/London”

Rule ID	Applicable Data Field	Secondary data field(s)	Rule Definition	Introduced in Version	Error Message “name”	Error Message “message”	Error Message “rule”
29.	speedLimitValueBased.mphValue		Must be one of defined values (e.g. 10, 20, 30, 40, 50, 60, 70)	3.3.0	Invalid ‘mphValue’	Speed limit value in miles per hour	'mphValue' must be an integer and one of these values: 10, 20, 30, 40, 50, 60, 70
30.	speedLimitValueBased.speedLimitValueType		This must be a string and one of the followings: “maximumSpeedLimit”, “minimumSpeedLimit”, “nationalSpeedLimitWellLitStreetDefault”	3.3.0	Invalid ‘type’	Speed limit value type value indicated	'type' must be one of 'maximumSpeedLimit, minimumSpeedLimit,nationalSpeedLimitWellLitStreetDefault'
31.	speedLimitProfileBased.type		This must be a string and one of these values: “nationalSpeedLimitDualCarriage”, “nationalSpeedLimitSingleCarriage”, “nationalSpeedLimitMotorway”	3.3.1	Invalid ‘type’	Speed limit based value indicated	'type' must be one of 'nationalSpeedLimitDualCarriageway,nationalSpeedLimitSingleCarriageway,nationalSpeedLimitMotorway’

32.	generalRegulation. regulationType		This must be a string and one of these values: "bannedMovementNoEntry", "bannedMovementNoLeftTurn", "bannedMovementNoRightTurn", "bannedMovementNoUTurn", "dimensionMaximumHeight Structural", "dimensionMaximumHeightWith TRO", "dimensionMaximumLength", "dimensionMaximumWeight Environmental", "dimensionMaximumWeight Structural", "dimensionMaximumWidth", "kerbsideControlledParkingZone", "kerbsideDisabledBadgeHolders Only", "kerbsideDoubleRedLines", "kerbsideFootwayParking", "kerbsideFootwayParking Prohibited", "kerbsideLimitedWaiting", "kerbsideLoadingBay", "kerbsideLoadingBayPassenger SetDownPermitted", "kerbsideLoadingBayPassengerSet DownProhibited", "kerbsideLoadingPlace", "kerbsideLoadingPlacePassenger SetDownPermitted", "kerbsideLoadingPlacePassenger	3.3.1	Invalid ‘type’	Object indicating a specific regulation (other than speed limit or user-defined off-list regulation)	'type' must be one of 'dimensionMaximumHeightStructural,dimensionMaximumHeightWithTRO,dimensionMaximumLength,dimensionMaximumWeightEnvironmental,dimensionMaximumWeightStructural,dimensionMaximumWidth,bannedMovementNoEntry,bannedMovementNoLeftTurn,bannedMovementNoRightTurn,bannedMovementNoUTurn,mandatoryDirectionAheadOnly,mandatoryDirectionLeftTurnOnly,mandatoryDirectionOneWay,mandatoryDirectionRightTurnOnly,movementOrderNoOvertaking,movementOrderPriorityOverOncomingTraffic,movementOrderProhibitedAccess,kerbsideDisabledBadgeHoldersOnly,kerbsideRuralClearway,kerbsideLimitedWaiting,kerbsideLoadingPlace,kerbsideMotorcycleParkingPlace,kerbsideNoLoadin

			SetDownProhibited", "kerbsideNoLoadingPassengerSet DownPermitted", "kerbsideNoLoadingPassengerSet DownProhibited", "kerbsideMotorcycleParkingPlace", "kerbsideNoLoading", "kerbsideNoStopping", "kerbsideNoWaiting", "kerbsideOtherYellowZigZag Mandatory", "kerbsideParkingPlace", "kerbsidePaymentParkingPlace", "kerbsidePermitParkingArea", "kerbsidePermitParkingPlace", "kerbsideRedRouteClearway", "kerbsideRestrictedParkingZone", "kerbsideRuralClearway", "kerbsideSchoolKeepClearYellow ZigZagMandatory", "kerbsideSingleRedLines", "kerbsideTaxiRank", "kerbsideUrbanClearway", "mandatoryDirectionAheadOnly", "mandatoryDirectionLeftTurnOnly", "mandatoryDirectionOneWay", "mandatoryDirectionRightTurnOnly" "miscBaySuspension", "miscBusGate", "miscBusLaneWithTrafficFlow", "miscBusOnlyStreet", "miscCongestionLowEmission Zone", "miscContraflow",				g,kerbsideNoStopping ,kerbsideNoWaiting,k erbsideTaxiRank,kerb sideSchoolKeepClear YellowZigZagMandato ry,kerbsideLoadingBa y,kerbsideOtherYello wZigZagMandatory,ke rbsidePermitParkingA rea,kerbsideParkingPl ace,kerbsideUrbanCle arway,kerbsideRedRo uteClearway,kerbside PaymentParkingPlace ,kerbsidePermitParkin gPlace,kerbsideFootw ayParking,kerbsideCo ntrolledParkingZone,k erbsideRestrictedPark ingZone,kerbsideDou bleRedLines,kerbside SingleRedLines,nonO rderMovementBoxJun ction,nonOrderKerbsi deBusStop,nonOrder KerbsidePedestrianCr ossing,miscBusGate, miscBusLaneWithTraf ficFlow,miscBusOnlyS treet,miscContraflowB usLane,miscCongesti onLowEmissionZone, miscCycleLane,miscP edestrianZone,miscR

Rule ID	Applicable Data Field	Secondary data field(s)	Rule Definition	Introduced in Version	Error Message “name”	Error Message “message”	Error Message “rule”
			"miscContraflowBusLane", "miscCycleLane", "miscCycleLaneClosure", "miscFootwayClosure", "miscLaneClosure", "miscPROWClosure", "miscPedestrianZone", "miscRoadClosure", "miscRoadClosureCrossingPoint", "miscSuspensionOfBusway", "miscSuspensionOfOneWay", "miscSuspensionOfParking Restriction", "miscSuspensionOfWeight Restriction", "miscTemporaryParkingBay", "miscTemporaryParkingRestriction" "movementOrderNoOvertaking", "movementOrderPriorityOver OncomingTraffic", "movementOrderProhibitedAccess" "nonOrderKerbsideBusStop", "nonOrderKerbsidePedestrian Crossing", "nonOrderMovementBoxJunction"				oadClosure,miscLane Closure,miscContraflo w,miscFootwayClosur e,miscCycleLaneClos ure,miscTemporaryPa rkingRestriction,miscS uspensionOfOneWay, miscSuspensionOfPar kingRestriction,miscS uspensionOfWeightR estriction,miscSuspen sionOfBusway,miscTe mporarySpeedLimit,m iscRoadClosureCrossi ngPoint,miscBaySusp ension,miscTemporar yParkingBay,miscPR OWClosure'
33.	offListRegulation.r egulationFullText		This must be a string	3.3.1	Invalid ‘regulationFull Text’	User-defined text name for referenced regulation	'regulationFullText' must be of type 'string' and be non-null.

Rule ID	Applicable Data Field	Secondary data field(s)	Rule Definition	Introduced in Version	Error Message "name"	Error Message "message"	Error Message "rule"
34.	offListRegulation.regulationShortName		This must be a string	3.3.1	Invalid 'regulationShortText'	User-defined short name for other type of regulation	'regulationShortText' must be of type 'string' and cannot be-null.
35.	one of speedLimitValueBased, speedLimitProfileBased, generalRegulation or offListRegulation must be present.		Condition –must be one and one only of the regulation sub types (4-way condition)	3.1.2	Invalid number and type of regulations	Object indicating the characteristics of a regulation	One and one only of the regulation sub types (SpeedLimitValueBased, SpeedLimitProfileBased, GeneralRegulation or OffListRegulation) must be present.
36.	rateTable.additionalInformation		If present, this must be a string and of URI format	3.3.1	Additional information	URI locator for supplementary additional information concerning use of the rate table.	If present, additional information must be formatted as URI
37.	rateTable.type		If present this must be a string and one of the values: "daily", "hourly"	3.3.1	Rate type	Defines the type of rate in use.	Rate type must be one of 'daily, hourly'
38.	rateLineCollection.applicableCurrency		If present, this must be a string and one of the values: "GBP", "EUR"	3.3.1	Applicable currency	The monetary currency that rates are specified in this rate line collection.	applicableCurrency must be one of 'EUR, GBP'

Rule ID	Applicable Data Field	Secondary data field(s)	Rule Definition	Introduced in Version	Error Message “name”	Error Message “message”	Error Message “rule”
39.	rateLineCollection.endValidUsagePeriod		If present, this must be a string and of date-time format	3.3.1	End usage valid period	The end time for the validity of this rate line collection.	If present ‘endValidUsagePeriod’ must be of type date-time YYYY-MM-DDTHH:MM:SS.
40.	rateLineCollection.maxTime		If present, this must be an ISO 8601-compliant duration	3.3.1	Max time	A maximum session duration to be applied to this rate line collection, specified in integer minutes.	If present ‘maxTime’ must be of type duration.
41.	rateLineCollection.maxValueCollection		If present, this must be a decimal	3.3.1	Max Value Collection	The maximum monetary amount to be applied in conjunction with use of this rate line collection. Defined in applicable currency with 2 decimal places.	If present ‘maxValueCollection’ must be of type decimal and not 0.0 or negative
42.	rateLineCollection.minTime		If present, this must be an ISO 8601-compliant duration	3.3.1	Min time	A minimum session duration to be applied to this rate line collection, specified in integer minutes.	If present 'minTime' must be of type duration and not 0.

Rule ID	Applicable Data Field	Secondary data field(s)	Rule Definition	Introduced in Version	Error Message "name"	Error Message "message"	Error Message "rule"
43.	rateLineCollection.minValueCollection		If present, this must be a decimal	3.3.1	Min Value Collection	The minimum monetary amount to be applied in conjunction with use of this rate line collection. Defined in applicable currency with 2 decimal places.	If present 'minValueCollection' must be of type decimal and not 0.0 or negative
44.	rateLineCollection.resetTime		If present, this must be a string and of time format	3.3.1	Reset Time	Time that rate resets.	If present 'resetTime' must be between '00:00:00' and '23:59:59'"
45.	rateLineCollection.sequence		Values must be sequential for all rateLineCollection instances in rateTable	3.1.2	Sequence	An indicator giving the place in sequence of this rate line collection.	'sequence' must be of type integer and not a negative number
46.	rateLineCollection.startValidUsagePeriod		This must be a string and of date-time format	3.3.1	Start usage valid period	The start time for the validity of this rate line collection.	'startValidUsagePeriod' must be of type date-time YYYY-MM-DDTHH:MM:SS.
47.	rateLine.description		If present, this must be a string	3.3.1	Invalid 'Description'	Free-text description associated with this rate line.	If present, description must not be empty

Rule ID	Applicable Data Field	Secondary data field(s)	Rule Definition	Introduced in Version	Error Message “name”	Error Message “message”	Error Message “rule”
48.	rateLine.duration End		If present, this must be an integer, representing minutes	3.3.1	Invalid ‘Duration end’	If used, indicates the end time for the applicability of the specific rate line, generally with respect to the start of the parking or other mobility session.	If present, durationEnd must be of type 'integer' and greater than 0
49.	rateLine.duration Start		If present, this must be an integer, representing minutes	3.3.1	Invalid ‘Duration start’	Indicates the start time for the applicability of the specific rate line.	If present, durationStart must be of type 'integer' and greater than 0
50.	rateLine.increment Period		If present, this must be an integer representing minutes	3.3.1	Increment period	The time period for incrementing the rate line charge. If set to the same as the duration of the period between the 'durationStart' and 'durationEnd' the increment will occur once per period.	If present, incrementPeriod must be in integer.

Rule ID	Applicable Data Field	Secondary data field(s)	Rule Definition	Introduced in Version	Error Message "name"	Error Message "message"	Error Message "rule"
51.	rateLine.maxValue		must be equal to or greater than zero	3.3.1	Invalid 'Max value'	The maximum monetary amount to be applied in conjunction with use of this rate line collection, regardless of the actual calculated value of the rate line. Defined in applicable currency with 2 decimal places	If present, maxValue must be defined in applicable currency with 2 decimal places and not 0.0
52.	rateLine.minValue	rateLine.maxValue	max must be greater than min	3.3.1	Invalid 'Min value'	The minimum monetary amount to be applied in conjunction with use of this rate line collection, regardless of the actual calculated value of the rate line. Defined in applicable currency with 2 decimal places	If present, minValue must be defined in applicable currency with 2 decimal places and not 0.0

Rule ID	Applicable Data Field	Secondary data field(s)	Rule Definition	Introduced in Version	Error Message "name"	Error Message "message"	Error Message "rule"
53.	rateLine.value		must be equal to or greater than zero	3.3.1	value	The value of the fee to be charged in respect of this rate line.	'value' must be defined in applicable currency with 2 decimal places.
54.	rateLine.sequence		Values must be sequential for all rateLine instances in rateLineCollection	3.3.0	Sequence	An indicator giving the place in sequence of this rate line collection.	'sequence' must be of type integer and not a negative number
55.	rateLine.type		This must be a string and one of the values: "flatRate", "incrementingRate", "flatRateTier", "perUnit"	3.3.1	Invalid 'Rate line type'	Indicates the nature of the rate line	'type' must be one of 'flatRate,incrementingRate,flatRateTier,perUnit'
56.	rateLine.usageCondition		This must be a string and one of the values: "fixedDuration," "fixedNumber", "once", "unlimited"	3.3.1	Invalid 'Rate usage condition type'	Indicates conditions on the use of this rate line.	'usageCondition' must be one of 'fixedDuration,fixedNumber,once,unlimited'
57.	maximumWidthCharacteristic.vehicleWidth		Where provided, it must be >0 <= 6m	3.2.2	This rule is not currently operational		
58.	maximumHeightCharacteristic.vehicleHeight		Where provided, it must be >0 <= 6m	3.2.2	This rule is not currently operational		
59.	maximumLengthCharacteristic.vehicleLength		Where provided, it must be >0 <= 40m	3.2.2	This rule is not currently operational		

Rule ID	Applicable Data Field	Secondary data field(s)	Rule Definition	Introduced in Version	Error Message "name"	Error Message "message"	Error Message "rule"
60.	maximumGrossWeightCharacteristic.grossVehicleWeight		Where provided, it must be >0 <= 50t	3.2.2	This rule is not currently operational		
61.	heaviestAxleWeightCharacteristic.heaviestAxleWeight		Where provided, it must be >0 <= 50t	3.2.2	This rule is not currently operational		
62.	vehicleCharacteristics.yearOfFirstRegistration		shall be >1900 and less than or equal to current year value	3.1.2	This rule is not currently operational		
63.	dayWeekMonth.applicableDay		Each instance within dayWeekMonth shall be unique	3.2.3	This rule is not currently operational		
64.	dayWeekMonth.applicableMonth		dayWeekMonth shall be unique	3.2.3	This rule is not currently operational		
65.	calendarWeekInMonth.weekInMonth		each instance within calendarWeekInMonth shall be unique	3.1.2	This rule is not currently operational		
66.	weekInMonth.applicableWeek		each instance within weekInMonth shall be unique	3.1.2	This rule is not currently operational		
67.	instanceOfDayWithinMonth		each instance within instanceOfDayWithinMonth shall be unique	3.1.2	This rule is not currently operational		
68.	timeValidity.start	timeValidity.end	end must be later than start, if present	3.2.3	This rule is not currently operational		
69.	timePeriodOfDay.startTimeOfPeriod	timePeriodOfDay.endTimeOfPeriod	End must be later than start	3.2.3	This rule is not currently operational		
70.	uniqueStreetReferenceNumber.nsgStreetName			3.2.0	This rule is not currently operational		

Rule ID	Applicable Data Field	Secondary data field(s)	Rule Definition	Introduced in Version	Error Message “name”	Error Message “message”	Error Message “rule”
71.	uniqueStreetReferenceNumber.nsgStreetNumber			3.2.0	This rule is not currently operational		

8. Rule validation errors

There is a set structure for errors to be displayed to users in the case that one or more validation rules are not met. The pattern of the structure is:

Rule Error:

- name: This field indicates the type of error.
- message: This field provides a more detailed description of the error.
- path: This field shows the location within the data structure where the error occurred.
- rule: This field specifies the validation rule that was violated.

Below, there is an example of an error raised when a record fails to submit.


```
{
   "ruleError_0": {
      "name": "Invalid 'Current Traffic regulation authority current owner'",
      "message": "Current Traffic regulation authority maintaining this D-TRO (SWA-like code)",
      "path": "Source -> currentTraOwner",
       "rule": " Current TRA must be a valid SWA-like code and known to the D-TRO Service; the TRA code must correspond with the appropriate
     App-ID "
   }
}
```


If there are multiple errors when validating, if they are within the same object (e.g. Provision) all errors are displayed. Otherwise, first error is displayed and once resolved, others are shown.

As example, if the below payload is being submitted to the system:


```
{
        “schemaVersion”: “3.3.0”,
        “data”: {
                “Source”: {
                        “actionType”: “unknown”,
```

```
                    “currentTraOwner”: “9999”,
                    “Provision”: [
                        {
                            “actionType”: “another”
                        }
                    ]
                }
            }
}
```

The first error that will appear will be about Source object, as below:

```
{
   "ruleError_0": {
      "name": "Invalid 'actionType' error",
      "message": "Indicates the nature of update between D-TRO records or their constituent parts",
      "path": "Source -> actionType",
      "rule": "Source 'unknown' must contain one of the following accepted values: 'new,amendment,noChange,errorFix'"
   },
   "ruleError_1": {
      "name": "Traffic regulation authority code submitted is invalid",
      "message": "TRA '1000' cannot add/update a TRO for another TRA. (This D-TRO creator ID is '1000', owner ID is '1001' )",
      "path": "Source -> traCreator and Source -> currentTraOwner",
      "rule": "'currentTraOwner' must be '1000' or '1001'"
   }
}
```

Once these errors are resolved, the errors about Provision will be displayed.

```
{
   "ruleError_0": {
      "name": "Invalid 'actionType'",
      "message": "Indicates the nature of update between D-TRO records or their constituent parts",
```

```
        "path": "Source -> Provision -> actionType",
        "rule": "Provision ‘actionType’” must contain one of the following accepted values:
'new,partialAmendment,fullAmendment,partialRevoke,fullRevoke,noChange,errorFix'"
    }
}
```