

511 Data Exchange including an Open511 Protocol

Traffic Event and WZDx

April 29, 2024

Version 1.6



METROPOLITAN
TRANSPORTATION
COMMISSION

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Document History

| Description | Version | Date |
|---|---------|------------|
| Working Draft - addressed reorganization comments | 0.9 | 08/28/13 |
| First published version with transit, traffic, tolling, and parking APIs | 1.0 | 09/13/13 |
| Update Traffic APIs' structure information, parameters and filters, and their examples to sync with specification provided on Open511.org. | 1.0 | 5/2/2014 |
| Add GTFS-realtime Trip Updates and Vehicle Positions, and their examples. | 1.0 | 5/7/2014 |
| Minor updates and corrections | 1.0 | 5/28/2014 |
| Add sample request endpoint and parameters and filters tables for Section 3.14 and 3.15. Update references for resource endpoints with their exact URL. | 1.0 | 6/12/2014 |
| Minor updates to Section 3.14 and 3.15 | 1.0 | 7/17/2014 |
| Split API specification document into sub docs for each API domain | 1.0 | 8/26/2014 |
| Minor updates to remove Transit references | 1.0 | 9/24/2014 |
| Removed APIs that are not planned to be developed | 1.0 | 08/01/2017 |
| Updated to add road closure polyline | 1.1 | 08/19/2018 |
| Updated to include splitting longer geometries into multiple 100 point Linestring. | 1.2 | 11/01/2018 |
| Updated to include extension to road and event element. | 1.3 | 09/17/2019 |
| Updated 'severity' definitions | 1.4 | 10/3/2019 |
| Added Work Zone Data Exchange (WZDx) API | 1.5 | 10/9/2023 |
| Updated description about data that will be provided when includeAllDefinedEnums=true. The API will provide special events under a new event type called special-event. | 1.6 | 03/21/2024 |

1 Overview

This document focuses on data exchange APIs for the traffic event data. For a complete overview of 511 Data Exchange, please refer to *Open 511 Data Exchange Specifications – Overview* document. The overview document covers:

- General information about 511 Data Exchange
- Different protocols and data feeds available through Open 511 APIs
- Standard Discovery API specifications.
- Encodings and Protocols along with reference to standard documentation.
- Technical Guidelines

It is highly recommended that all users of Open 511 Data Exchange review the information in the Overview document.

2 Traffic API

The core traffic data resources consist of traffic and work zone events. Open511 provides message structure and API endpoint for accessing these resources. Open511 will also provide metadata/lookup information that can be used by consumers to filter and limit information during requests.

2.1 API: Event

The event resource provides information about various types of events within a jurisdiction. These can be active incident, scheduled construction/roadway work or public events which may or may not have an impact on traffic conditions. Consumers can request list of all the active events or they can use additional filters such as city, roads to restrict the results as per their needs and use case.

The event structure is the main element of the events collection. Although an event should be considered as independent, it is possible that one major event (mainly construction) could be split across several events. Below is a message structure of Event.

| Field | Type | Mandatory/Optional | Description |
|---------------------|--------|--------------------|--|
| Self | Link | <i>Mandatory</i> | Self link to the current resource. |
| Jurisdiction | Link | <i>Mandatory</i> | Link to the jurisdiction publishing the event. |
| id | String | <i>Mandatory</i> | A globally unique ID for the event, following the format jurisdiction-id/event-id. For example, 511.org/8c3f2. The first segment of the event ID is the jurisdiction ID. The second segment is a string ID that must be unique within its jurisdiction. It can contain the characters |

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| | | | <p>a-zA-Z0-9_.-. The two segments are separated with a /.</p> <p>The event's self link is of course itself a globally unique ID, and it is a suggested practice to use the event ID in the event URL, but a separate ID field is included for user-friendliness.</p> |
| Status | Enum | <i>Mandatory</i> | <p>Status of the event. The status allows a client to determine if the current event should be considered as currently effective. Value list:</p> <ul style="list-style-type: none"> - ACTIVE: The event should be considered as effective - ARCHIVED: The event should not be considered as effective |
| Headline | Free Text | <i>Mandatory</i> | <p>Title of the event. Should be shorter than 500 characters.</p> |
| event_type | Enum | <i>Mandatory</i> | <p>Basic type of event. Value list</p> <ul style="list-style-type: none"> - CONSTRUCTION: planned road work - SPECIAL_EVENT: special events (fair, sport event, etc.) - INCIDENT: accidents and other unexpected events - WEATHER_CONDITION: Weather condition affecting the road - ROAD_CONDITION: Status of the road that might affect travelers. |
| Severity | Enum | <i>Mandatory</i> | <p>Severity of the event. Value list:</p> <ul style="list-style-type: none"> MINOR: the event has very limited impact on traffic. MODERATE: the event will have a visible impact on traffic but travel delays and traffic queuing should be minimal and local. MAJOR: the event will have an elevated impact on traffic and create noticeable traffic delays and traffic queuing, but on a local level. SEVERE: the event will have a significant impact on traffic and create severe traffic delays and traffic queuing on a large scale. UNKNOWN: the impact is unknown, for example in the case of an accident that has been recorded without a precise description. |

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| Geography | Geospatial | <i>Mandatory</i> | Geographical information about the event. Can be Point, MultiPoint, LineString, MultiLineString, or Polygon. |
| closure_geometry | Geospatial | <i>Optional</i> | Multistring geometry for closure associated with an event. The individual LineStringMember represents affected segment of a road. For events that expand over non-contiguous road segments, for example a closure affecting both sides of the freeway, each side will be represented by separate LineStringMember. For continuous event, entire geometry may be split into multiple LineStringMembers due to limitation on number of points that can be included in one line string. When this happens, end point of one line string will be the start point of the next line string. |
| Created | DateTime (UTC) | <i>Mandatory</i> | When the event was initially created. |
| Updated | DateTime (UTC) | <i>Mandatory</i> | When the content of the event last changed. Will be the same as created if no updates have occurred. |
| Schedule | <i>schedule</i> elements | <i>Mandatory</i> | Indicates the dates and times when the event is active. |
| Timezone | timezone | <i>Optional</i> | Timezone to be used for this event, e.g. America/Montreal. If not provided, the event is assumed to be in the default timezone of its jurisdiction. |
| Description | Free text | <i>Optional</i> | <i>But strongly recommended.</i> Description of the event. Plain text description of the event, the reason for the event and any other relevant information for travelers. |
| event_subtypes | Collection of event_subtype elements | <i>Optional</i> | List of values to provide more detail about the type of event. |
| — event_subtype | Enum | <i>Optional</i> | unknown Construction Emergency construction Scheduled roadwork Overnight roadwork Street sweeping Utility work Repaving Bridge work |



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| | | | <p>Drawbridge testing Guard rail repairs Tree trimming Mowing Watermain break repairs Long-term construction Weekend long construction Traffic signal repairs Overhead sign repair CCTV repairs Gas main repairs Tunnel washing CMS repairs Bridge painting Line striping Barrier repairs Deck work Bridge cable repairs FasTrak toll lane repairs Toll lane repairs Toll plaza repairs Crack sealing Expansion joint repairs Attenuator repairs Tunnel repairs Rock blasting Installation of fiber optics Renovation Structure repair Road widening Intersection improvements Drainage improvements Installation of sign structure Noise wall construction Installation of traffic monitoring systems Safety improvements Steel repairs Installation of conduits Installation of traffic management systems Culvert repairs Viaduct repairs Test message Seismic retrofit Landscaping Grinding Electrical work Slide clean-up Slide repair Light pole repair Median Work Trench work Highway construction Paving Sound wall construction Roadwork Emergency lane closure</p> |
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| | | | <p>Emergency road closure Pothole Repair unknown Severe traffic incident Oil spill Spill Hazmat spill Transit related incident Severe traffic alert Earthquake Landslide Flood Tornado Emergency road closure Unplanned demonstration Rollover-overturn-jackknife Non-vehicle fire-explosion Grass fire Fire Noncollision injury Chemical spill Diverted traffic TO westbound lanes Diverted traffic TO eastbound lanes Diverted traffic TO northbound lanes Diverted traffic TO southbound lanes Diverted traffic FROM westbound lanes Diverted traffic FROM eastbound lanes Diverted traffic FROM northbound lanes Diverted traffic FROM southbound lanes Collision with impact attenuator Collision with bridge structure Collision with guardrail Collision with concrete traffic barrier Collision with post Collision with pole or support Collision with culvert or ditch Collision with curb CHP at the scene Collision with fence Collision with wall Collision with fire hydrant Collision with shrubbery or bush Collision with tree CHP enroute Collision with pavement surface irregularity Sigalert Accident Overturned truck Overturned tractor trailer Overturned vehicle Accident investigation Jack-knifed tractor trailer Split tractor trailer Separated tractor trailer Single vehicle accident</p> |
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| | | | Overheight tractor trailer Truck fire Bus fire Tractor trailer fire Vehicle fire Brush fire Building fire Fire department activity Police department activity EMS activity Disabled truck Disabled tractor trailer Disabled vehicle Disabled bus Emergency construction Roadwork Roving repairs Flooding Icing Fog Snow Wet pavement High winds Weather related Downed tree Downed wires Downed pole Nearby building collapse Debris Cargo spill Fuel spill Water main break Abandoned vehicle Heavy traffic Delays Power failure - toll plaza Signal problem Stuck drawbridge Stuck gates Drawbridge open Transformer fire Gas main break Injured animal Demonstration Rubber necking Sun glare Special event Construction Unknown other Unknown other with information Accident with injuries Accident with property damage only Accident road closed Spinout Shifted plates Road collapse |
|--|--|--|---|



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|------------------|------|-----------------|--|
| | | | <p>Marine-Boat traffic Residual delays Motorcycle accident Missing manhole cover Raised manhole Collapsed manhole Collapsed sewer grate Missing sewer grate Obstruction Test message Multi-vehicle accident Two vehicle accident Structure Fire Structure Collapse Stuck Crossing Gates Pothole unknown Baseball game Football game Basketball game Hockey game Soccer game Tennis tournament Golf tournament Circus Parade Fireworks Concert Street fair Fair Festival Awards ceremony March Race Racing Fleet week Special Event Boxing Movie-TV filming New years eve Skating Track and Field Marathon VIP Visit Test Message Convention Conference</p> |
| Certainty | Enum | <i>Optional</i> | <p>Degree of certainty of the event. Should only be used for unplanned events (e.g. incidents, weather conditions and pavement conditions events). Value list to be confirmed. Could be observed/likely/possible/unknown.</p> <p>Value list</p> |

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|-----------------------|--------------------------------|-----------------|--|
| | | | <ul style="list-style-type: none"> - OBSERVED - LIKELY - POSSIBLE - UNKNOWN |
| grouped_events | Collection of links | <i>Optional</i> | This structure is used to group events together. In specific situations (for example complex construction projects), several events might be related together. This field should be used to point a related event. |
| — related | Link | <i>Optional</i> | Link pointing to another event resource related to the current event. |
| Detour | Free Text | <i>Optional</i> | Description of a detour route to avoid this event. |
| Roads | Collection of road elements | <i>Optional</i> | List of roads affected by the current event. One event can impact several roads. |
| Areas | Collections of area elements | Optional | Areas affected by the event. |
| attachments | Collection of attachment links | Optional | Collection of attachments providing additional information about the event (PDFs, images, etc.) |
| — related | Link | Optional | Link to an attachment. While only the URL is mandatory, more information may be provided via type, length, title, and hreflang, with semantics as in Atom. |
| source_type | Enum | Optional | Caltrans CHP TIC (511's Traveler Information Center – used for special events) |
| source_id | Free Text | Option | Identifier received from external system. |

Road structure

The road data format is used to provide information about the road(s) affected by an event. The structure of road_affected is:

| Field | Type | Mandatory/ Optional | Description |
|-------------|-----------|------------------------|--|
| Name | Free Text | <i>Mandatory</i> | Name of the road affected by the event. Ideally, road names should be formatted in accordance with national or regional standards, and the same road should be named consistently in different events. |

| | | | |
|---------------------------|-----------|--------------------|---|
| self / url | Link | <i>Optional</i> | Link to the Road resource for this road. |
| from | Free text | <i>Optional</i> | <p><i>Mandatory if 'to' is provided.</i></p> <p>Approximate start point of the event on the road. It can be an intersection with another street or it can be a mileage indication.</p> <p>This value should not be used to determine the exact start point since it can be an approximation. The geometry field should be considered as the reference for exact location.</p> <p>If no <i>to</i> field is provided, this field means "nearby".</p> |
| to | Free text | <i>Optional</i> | Approximate end point of the event on the road. It can be an intersection with another street or it can be a distance indication. |
| state | Enum | <i>Optional</i> | <p>Whether the road segment is closed or not.</p> <p>Value list:</p> <ul style="list-style-type: none"> - CLOSED (road closed in the given direction. Used when lane_type = "All lanes"; and lane_status = "blocked closed") - SOME_LANES_CLOSED (but the road remains open. Default value) - SINGLE_LANE_ALTERNATING (a single lane alternates between both directions of traffic. Used when roadway_advisory = "One way traffic control in effect") - ALL_LANES_OPEN Used when lane_type = "All lanes"; and lane_status = "open") |
| direction | Enum | <i>Conditional</i> | <p><i>Mandatory if state is provided.</i></p> <p>Direction of the road that is affected by the event.</p> <p>Value list:</p> <ul style="list-style-type: none"> -Eastbound -Eastbound and Westbound -Northbound -Northbound and Southbound -Southbound -Westbound |
| impacted_lane_type | Enum | <i>Optional</i> | <p>The type of lane(s) impacted by the event.</p> <p>At least 1 lane All lanes</p> |



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| | | | <p>All lanes subject to</p> <p>All lanes temporarily</p> <p>Alternate lanes</p> <p>Center lane</p> <p>Center lanes</p> <p>Left lane</p> <p>Left lane and shoulder</p> <p>Left lanes</p> <p>Left shoulder</p> <p>Left and center lanes</p> <p>Lane</p> <p>Lanes</p> <p>Right lane</p> <p>Right lane and shoulder</p> <p>Right lanes</p> <p>Right shoulder</p> <p>Right and center lanes</p> <p>Right and left lanes</p> <p>Sporadic lane</p> <p>Temporary lane</p> <p>Various lanes</p> <p>Bus lane</p> <p>Right lane and exit ramp</p> <p>Left lane and exit ramp</p> <p>Right lane and entrance ramp</p> <p>Left lane and entrance ramp</p> <p>FasTrak lanes</p> <p>FasTrak toll lanes</p> <p>Toll lanes</p> <p>Toll lane</p> <p>Carpool</p> <p>HOV</p> <p>2nd lane from the left</p> <p>3rd lane from the left</p> <p>4th lane from the left</p> <p>Auxiliary Lane</p> <p>Center Divider</p> <p>Left Bore</p> <p>Off Ramp</p> <p>On Ramp</p> <p>Right Bore</p> |
| road_advisory | Enum | <i>optional</i> | <p>A roadway advisory for the traveler. Can be combined with impacted_lane_type and lane_status to add further context. Example: <i>Right lanes closed until 4 PM.</i></p> <p>until further notice</p> <p>until midnight</p> <p>until 12-30 AM</p> <p>until 1 AM</p> <p>until 1-30 AM</p> <p>until 2 AM</p> <p>until 2-30 AM</p> <p>until 3 AM</p> <p>until 3-30 AM</p> |



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| | | | until 4 AM until 4-30 AM until 5 AM until 5-30 AM until 6 AM until 6-30 AM until 7 AM until 7-30 AM until 8 AM until 8-30 AM until 9 AM until 9-30 AM until 10 AM until 10-30 AM until 11 AM until 11-30 AM until 12-30 PM until 1 PM until 1-30 PM until 2 PM until 2-30 PM until 3 PM until 3-30 PM until 4 PM until 4-30 PM until 5 PM until 5-30 PM until 6 PM until 6-30 PM until 7 PM until 7-30 PM until 8 PM until 8-30 PM until 9 PM until 9-30 PM until 10 PM until 10-30 PM until 11 PM until 11-30 PM Both levels 2 mile back-up 2 and a half mile back-up 1 mile back-up 1 and a half mile back-up 3 mile back-up 3 and a half mile back-up 4 mile back-up 5 mile back-up 6 mile back-up 7 mile back-up 8 mile back-up 9 mile back-up 10 mile back-up 1 hour delay 10 minute delay 15 minute delay |
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| | | | <p>2 way traffic 20 minute delay 25 minute delay 30 minute delay 35 minute delay 40 minute delay 45 minute delay 50 minute delay 55 minute delay thru AM rush hour thru PM rush hour thru PM thru AM until noon Traffic is being diverted Expect delays Emergency vehicles enroute Emergency vehicles at the scene Emergency crews enroute Emergency crews at the scene Traffic advisory in effect Metering lights are on Metering lights are off Avoid the area One way traffic control in effect Consider using alternate routes</p> |
| lane_status | Enum | <i>Optional</i> | <p>affected blocked closed open remain closed remains closed</p> |
| article | Enum | <i>Optional</i> | <p>Provides locational context for the event. For examples, can be combined with from, to, and direction to pinpoint the approximate location of the event. Example: <i>I-680 Northbound <u>at</u> El Cerro Blvd.</i></p> <p>unknown approaching area of at between east of from near north of ramp from ramp to south of to west of before by</p> |

| | | | |
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| | | | <p>past through under over into-out of ramps from ramps to entering at exiting at into out of bypassing after on</p> |
| areas | Collection of area elements | <i>Optional</i> | The areas resource is a list of area items. Area is a geographical area: a city, district, neighbourhood, etc. |
| lanes_open | Integer | <i>Optional</i> | <p>Allowed only if state is SOME_LANES_CLOSED and direction is not BOTH.</p> <p>Number of lanes in the given direction remaining open during this event.</p> |
| lanes_closed | Integer | <i>Optional</i> | <p>Allowed only if state is SOME_LANES_CLOSED and direction is not BOTH.</p> <p>Number of lanes in the given direction closed during this event.</p> |
| impacted_systems | Collection of <i>impacted_system</i> elements | <i>Optional</i> | Allows provision of information about other systems that can be affected. |
| — impacted_system | Enum | <i>Optional</i> | <p>Value list of systems:</p> <p>ROAD SIDEWALK BIKELANE PARKING</p> |
| restrictions | Collection of <i>restriction</i> elements | <i>Optional</i> | Some events may come with some restrictions affecting vehicles using the road (speed, weight). |

Area structure

| Field | Type | Mandatory/Optional | Description |
|-------------|-------------|--------------------|---|
| Name | Free text | <i>Mandatory</i> | The name of the area. |
| id | Opent511 ID | <i>Mandatory</i> | Unique identifier for the area from the GeoNames database, in the form of e.g. geonames.org/5323810. |
| self | Link | <i>Optional</i> | URL to a human-readable Web page with information about the area. Example http://geonames.org/{id}/ |

Restriction structure

| Field | Type | Mandatory/Optional | Description |
|-------------------------|-------|--------------------|---|
| restriction_type | Enum | <i>Mandatory</i> | Type of restriction that affects vehicles. Value list: SPEED: Limitation of the speed of vehicles. Unit is in kilometers/hour. WIDTH: Width limitation, mainly for trucks. Unit is meters. HEIGHT: Height limitation, mainly for trucks. Unit is meters WEIGHT: Weight limitation for vehicles. Unit is metric tons. AXLE_WEIGHT: Weight limitation per axle for truck. Unit is metric tons. |
| Value | Float | <i>Mandatory</i> | Value of the limitation. For example, a speed limitation of 60km/h will have a value of 60 with a restriction_type set to SPEED |

Schedule structure

The schedule defines timelines of an event.

| Field | Type | Mandatory/ Optional | Description |
|----------------------------|--|------------------------|---|
| recurring_schedules | Collection of <u>recurring_schedule</u> elements | Conditional | <p>One (and only one) of <code>recurring_schedules</code> or <code>intervals</code> is required</p> <p>The recurring_schedule structure expresses repeating schedules, like "Every day starting December 4th", or "Mondays 9 to 11 from September 1 to October 30." An event can include multiple <code>recurring_schedule</code> elements inside this <code>recurring_schedules</code> tag; <code>exception</code> elements can override them.</p> |
| — start_date | Date | Mandatory | <p>Mandatory in each <code>recurring_schedule</code></p> <p>Start date of this schedule.</p> |
| — end_date | Date | Optional | End date of the event. If a start date but no end date is provided, the schedule continues indefinitely. |
| — daily_start_time | Time | Optional | <p>Daily start time of the event, as <code>HH:mm</code>, e.g. <code>13:00</code>.</p> <p>Applies to each day in this <code>recurring_schedule</code>.</p> |
| — daily_end_time | Time | Conditional | <p>Mandatory if <code>daily_start_time</code> is provided, not allowed otherwise</p> |

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| | | | <p>Daily end time of the event, as <code>HH:mm</code>, e.g. <code>17:30</code>. Applies to each day in this <code>recurring_schedule</code>.</p> |
| — days | collection of <i>day</i> elements | <i>Optional</i> | <p>Contains a <code>day</code> tag for every day of the week during which this <code>recurring_schedule</code> is active. Days are indicated with an integer, with (following the ISO standard) Monday being 1 and Sunday 7. So, for an event active on Monday and Wednesday, <code><days><day>1</day><day>3</day></days></code>. If omitted, the schedule is active every day between its start and end dates.</p> |
| exceptions | Collection of <code>exception</code> elements | <i>Optional</i> | <p><i>if present, there must be a <code>recurring_schedules</code> element (and no <code>intervals</code>)</i></p> <p>Exceptions override recurring schedules.</p> |
| — exception | Custom time format | <i>Mandatory</i> | <p>An exception provides the definitive schedule for a specific date. It overrides any <code>recurring_schedule</code> information for that date.</p> <p>An exception of the form <code>YYYY-MM-DD</code> indicates that this event is not in effect for the given date.</p> <p>An exception of the form <code>YYYY-MM-DD HH:mm-HH:mm</code> indicates that, on that date, the event is in effect only</p> |

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| | | | <p>between the provided start and end time. If there are multiple disjoint periods on that day, more than one start-end period can be included: <code>YYYY-MM-DD HH:mm-HH:mm HH:mm-HH:mm</code>.</p> |
| intervals | Collection of <code>interval</code> elements | Conditional | <p><i>One (and only one) of <code>recurring_schedules</code> or <code>intervals</code> is required</i></p> <p>Represent an event's schedule as a list of explicit periods. An event must use either <code>recurring_schedules</code> or <code>intervals</code>, not both.</p> <p>If this contains more than one <code>interval</code>, their time periods may not overlap. This also implies that no more than one can omit an end time.</p> |
| — interval | Custom time format, largely a subset of ISO8601 intervals | <i>Mandatory</i> | <p>Defines a specific period of time during which the schedule is in effect; two <code>datetimes</code> (without timezone offset) joined with a <code>/</code>. For example, a period from 9 p.m. September 1 to 8 a.m. September 2 would be <code>2014-09-01T21:00/2014-09-02T08:00</code>.</p> <p>The second datetime, after the slash, may be omitted. So, to indicate a period from 9 p.m. September 1 until further</p> |

| | | | |
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| | | | notice, use: 2014-09-01T21:00/ |
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Sample request endpoint for events

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| Request Type | GET |
| Request Endpoint Example | For e.g. http://api.511.org/Traffic/Events |

Parameters and Filters supported with the request

| Parameter | Mandatory/Optional | Description |
|---------------------|--------------------|---|
| format | <i>Optional</i> | The response format (json/xml) desired. If none specified, then default response would be JSON. e.g. ?format=json (returns json response for v1, if v1 is the latest version or specified via version parameter) ?format=xml (returns XML response for v1) |
| version | <i>Optional</i> | The version of Open511 desired. e.g. ?version=v1 (returns response for v1 in conjunction with format requested.) |
| api_key | Mandatory | Unique key assigned to a user after they signup for Open511. |
| status | <i>Optional</i> | By default the API should only send active events. Supported values: ACTIVE Default value, returns only active events. ARCHIVED Returns only archived events ALL Returns both active and archived events. |
| in_effect_on | <i>Optional</i> | Show only events that are, according to their schedules, in effect at a specific time, or during a specific time period. Can be either a single time, or a start and end time joined by a comma. The times must be complete ISO 8601 datetimes, with or without a timezone. So to find, for example, all events in effect at some point on June 20th, you would ask for events between 00:00 and 23:59: in_effect_on=2013-06-20T00:00,2013-06-20T23:59 |

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| | | <p>Or, to find events in effect within the next two hours, you'd get the current UTC timestamp — let's say it's 2013-06-20T17:40Z — and then request <code>?in_effect_on=2013-06-20T17:40Z,2013-06-20T19:40Z</code>.</p> <p>You can also use the special value <code>?in_effect_on=now</code> to show events currently taking place.</p> <p>If no timezone is provided, as in the first example, the server searches according to the local time as entered in the event. For example, if highways are closed for an hour at midnight on January 1st in both London and LA, <code>?in_effect_on=2014-01-01T00:00</code> would return both events (even though there's no single moment in time when the roads are closed in both cities), whereas the timezone-aware <code>?in_effect_on=2014-01-01T00:00Z</code> would return only the London event.</p> <p>If this argument is not provided, the API should not perform any filtering based on the event schedules.</p> |
| severity | <i>Optional</i> | Filter by the value of the severity field. OR queries are possible via a comma-separated list: <code>?severity=MINOR,MODERATE</code> . |
| Bbox | Optional | Filter events by geographical bounding box. Four comma-separated coordinates, xmin, ymin, xmax, ymax. |
| geography | Optional | <p>Filtering near a point or linestring. The geography value should be provided as a WKT string in WGS84 latitude/longitude. Example:</p> <p><code>...geography=POINT (-73.64 45.52)</code>.</p> <p>The geography must be used in conjunction with the tolerance filter.</p> |
| tolerance | Conditional | <p>Provide a tolerance of radius in meters around if a POINT or LINESTRING is used as filtering parameter. For example</p> <p><code>...geography=POINT+(-73.64+45.52)&tolerance=50</code> would retrieve all the events within a circle of 50m radius around the selected point.</p> |
| jurisdiction | Optional | <p>The ID or URL of a jurisdiction, in order to show only events from a given jurisdiction. Use a comma-separated list to make OR queries.</p> <p>Example: <code>jurisdiction=511.org</code>.</p> |
| event_type | Optional | Filter events using the event_type value list. Use a comma-separated list to make OR queries. |
| event_subtype | Optional | Filter events using the event_subtype value list. Use a comma-separated list to make OR queries. |
| created | Optional | Filter events based on the creation date and time. |

| | | |
|------------------|----------|---|
| | | This parameter can (and generally will) be preceded with one of the following operators: < <= > >=. These allow searches for events created before or after a supplied time, e.g. created=>2013-05-10T12:00Z. |
| updated | Optional | Filter events based on the last update timestamp. Accepts the same < <= > >= operators as created. Note: by default, the servers should only return ACTIVE events. When using the updated filter, in order to get events going from ACTIVE to ARCHIVED, the client must ask for all events: ...?status=ALL |
| road_name | Optional | Shows only events containing a road element with the provided name. Case-sensitive exact match. Use a comma-separated list to make OR queries. |
| Road | Optional | Shows only events containing a road element linking to a road element with the provided id. Use a comma-separated list to make OR queries. |
| Area | Optional | Shows only events containing an area element with the provided id. Use a comma-separated list to make OR queries. |
| Limit | Optional | The maximum number of events to return in a single paginated response. The default value for this (i.e. how many items to include on a page if no limit parameter is provided) is up to individual implementors. Likewise, implementors may want to enforce a maximum value for this parameter in order to conserve server resources, so that a ?limit=10000 query would still return only e.g. 500 events per page. However, if such a maximum is implemented, it must not be lower than 500. |

The traffic event structure response for XML is shown in Appendix A Section A.I.I and for JSON is shown in Appendix B Section B.I.I.

Possible Errors

Listed below are HTTP status code and message returned for certain common errors:

- 500 - Internal Server Error (System has issues processing your request)
- 401 – Unauthorized (Invalid API key)

- 404 – Not found (If an individual event resource cannot be located).

2.2 Work Zone Data Exchange (WZDx) API

The Work Zone Data Exchange (WZDx) API resource utilizes the WZDx Specification developed by US Department of Transportation (USDOT) to provide real-time work zone data. This resource consists of two major contents in WZDx, the WorkZoneRoadEvents and DetourRoadEvents. Detailed information about the WZDx data specification contents can be found on the URL: <https://github.com/usdot-jpo-ode/wzdx>.

WZDx API response is only available in the [GeoJSON](#) format as per the specification. A sample output of WZDx API response is provided in Appendix B.

Sample request endpoint for events

| | |
|--------------------------|--|
| Request Type | GET |
| Request Endpoint Example | For e.g. http://api.511.org/traffic/wzdx&api_key=ENTER-API-KEY-HERE |

Parameters and Filters supported with the request

| Parameter | Mandatory/ Optional | Description |
|------------------------|---------------------|--|
| api_key | Mandatory | Unique key assigned to a user after they signup for Open511. |
| includeAllDefinedEnums | Optional | By default, the API converts non-standard directional value 'Both' and event type value 'special_event' to WZDx specification allowed values 'undefined' and 'work_zone' respectively. When this filter is set to 'True' the directional and event_type values will be unmasked and be provided with value 'Both' as directions and 'special event' as event type. |

Possible Errors

Listed below are HTTP status code and message returned for certain common errors:

- 500 - Internal Server Error (System has issues processing your request)
- 401 – Unauthorized (Invalid API key)
- 404 – Not found (If an individual event resource cannot be located).

3 Appendix A: API Response Messages- XML

3.1 Traffic Event XML

A.1.1 Example Traffic Event Structure Response (XML)

```
<open511
  xmlns:gml="http://www.opengis.net/gml"
```

```

    xml:lang="en"
    xml:base="http://api.511.org"
    version="v1"
  >
<events>
  <event>
    <status>ACTIVE</status>
    <link rel="self" href="/traffic/events/511.org/149"/>
    <link rel="jurisdiction" href="http://api.511.org/jurisdictions/511.org/" />
    <id>511.org/149</id>
    <headline>CHP : Accident on CA-160 Northbound between Main St (Antioch) and Antioch
    Bridge - Toll Plaza (Oakley). All lanes closed. Expect delays.
    </headline>
    <event_type>INCIDENT</event_type>
    <event_subtypes>
      <event_subtype>Accident</event_subtype>
    </event_subtypes>
  <severity>UNKNOWN</severity>
  <created>2014-05-01T19:28:31Z</created>
  <updated>2014-05-01T19:28:31Z</updated>
  <geography>
    <gml:Point srsName="EPSG:4326">
      <gml:coordinates>-121.75382399999999,38.004908</gml:coordinates>
    </gml:Point>
  </geography>
  <roads>
    <road>
      <name>CA-160</name>
      <from>Main St</from>
      <to>Antioch Bridge - Toll Plaza</to>
      <direction>NorthBound</direction>
      <state>Closed</state>
      <lane_type xmlns:gml="http://www.opengis.net/gml" xmlns="http://511.org/open511-
      extensions">
        All lanes
      </lane_type>
      <road_advisory xmlns:gml="http://www.opengis.net/gml" xmlns="http://511.org/open511-
      extensions">
        Expect delays</road_advisory>
      <lane_status xmlns:gml="http://www.opengis.net/gml" xmlns="http://511.org/open511-
      extensions">
        closed</lane_status>
      <article xmlns:gml="http://www.opengis.net/gml" xmlns="http://511.org/open511-
      extensions">
        between
      </article>
    </road>
  </roads>
  <areas>
    <area>
      <name>Antioch</name>
      <id>geonames.org/5324200</id>
      <link rel="self" href="http://geonames.org/5324200/" />
    </area>
    <area>
      <name>Oakley</name>
      <id>geonames.org/5378566</id>
      <link rel="self" href="http://geonames.org/5378566/" />
    </area>
  </areas>

```

```

    </areas>
  <schedules>
    <schedule>
      <start_date>2014-05-01</start_date>
    </schedule>
  </schedules>
</event>
<event>
  <status>ACTIVE</status>
  <link rel="self" href="/traffic/events/511.org/209"/>
  <link rel="jurisdiction" href="http://api.511.org/jurisdictions/511.org/">
  <id>511.org/209</id>
  <headline>CHP : Obstruction on US-101 N NorthBound before Coyote Creek Golf Dr (San
Jose) left lane blocked Expect delays</headline>
  <event_type>INCIDENT</event_type>
  <severity>UNKNOWN</severity>
  <created>2014-05-02T01:13:55Z</created>
  <updated>2014-05-02T02:43:16Z</updated>
  <geography>
    <gml:Point srsName="EPSG:4326">
      <gml:coordinates>-121.69346399999999,37.19068</gml:coordinates>
    </gml:Point>
  </geography>
  <roads>
    <road>
      <name>US-101 N</name>
      <from>Coyote Creek Golf Dr</from>
      <to/>
      <direction>NorthBound</direction>
      <state>Open</state>
    </road>
  </roads>
  <schedules>
    <schedule>
      <start_date>2014-05-01</start_date>
    </schedule>
  </schedules>
  <closure_geometry xmlns:gml="http://www.opengis.net/gml" xmlns="http://511.org/open511-
extensions">
  <gml:MultiLineString srsName="urn:ogc:def:crs:EPSG::4326">
  <gml:LineStringMember>
  <gml:LineString>
  <gml:posList>
-121.905403778982,37.4664031808211,-121.905516999724,37.466542000284,-
121.905530999967,37.4665599997276,-121.905550000234,37.4665840000328,-
121.905665999687,37.4667269999391,-121.906012000191,37.4671670002383,-
121.906404999653,37.4676470002688,-121.906715000173,37.4680369998512,-
121.907135000298,37.4685380001628,-121.907393999865,37.4688380001212,-
121.907569999593,37.4690580000859,-
121.907808999967,37.4693440001416,121.938268000236,37.512444999755,-
121.938432000268,37.512730000037,-121.938663000246,37.5131339997496,-
121.93890799957,37.5135559999043,-121.939175000432,37.514022000349,-
121.939356000182,37.5143290001285,-121.939525000237,37.5146310001649,-
121.939581665124,37.5147344758603
  </gml:posList>
  </gml:LineString>
  </gml:LineStringMember>
  <gml:LineStringMember>
  <gml:LineString>

```

```

<gml:posList>
-121.941468948045,37.5310149698319,-121.941338999731,37.531097000203,-
121.941265999936,37.5311409999076,-121.941188999943,37.5311869999595,-
121.941030999759,37.5312800001638,-121.940669000259,37.5314930001716,-
121.940090999951,37.5318160000229,-121.939761000238,37.5319949996535,-
</gml:posList>
</gml:LineString>
</gml:LineStringMember>
<gml:LineStringMember>
<gml:LineString>
<gml:posList>
-121.885072507042,37.574436747037,-121.885018000099,37.5744620003296,-
121.884722999648,37.5745870001079,-121.884567999837,37.5746469998415,-
121.884411000377,37.5747040000065,-121.884217000208,37.5747680001896,-
121.88396199994,37.5748509998558,-121.883647000295,37.5749509997424,-
121.883442000256,37.5750149997133,-121.882085999623,37.5754569997014,-
121.881545999848,37.5756320001267,-121.88146600038,37.5756530000647,-
121.880771999721,37.5758790003444,-121.880544000115,37.5759670002614,-
121.88040299965,37.5760220002457,-121.880283999824,37.576072999716,-
121.880199000334,37.5761110002897,-121.880077000135,37.5761699999243,-
121.879953000286,37.5762310001006,-121.879832999737,37.5762890000585,-
121.879713999912,37.576352000107,-121.879580000017,37.5764280001421
</gml:posList>
</gml:LineString>
</gml:LineStringMember>
</gml:MultiLineString>
</closure_geometry>
<source_name xmlns:gml="http://www.opengis.net/gml" xmlns="http://511.org/open511-
extensions">
CHP
</source_name>
<source_id xmlns:gml="http://www.opengis.net/gml" xmlns="http://511.org/open511-
extensions">
1234
</source_id>
</event>
</events>
  <pagination>
    <offset>0</offset>
    <link rel="next" href="/traffic/events/?api_key={api_key}&limit=2&offset=2"/>
  </pagination>
  <link rel="self" href="/traffic/events/?api_key={api_key}&limit=2&offset=0"/>
  <link rel="up" href="/"/>
</open511>

```

4 Appendix B: API Response Messages- JSON

4.1 Traffic Event JSON

B.1.1 Example Traffic Event Structure Response (JSON)

```
{
  "events": [{
    "url": "/traffic/events/511.org/149",
    "jurisdiction_url": "http://api.511.org/jurisdictions/511.org/",
    "id": "511.org/149",
    "status": "ACTIVE",
    "headline": "CHP : Accident on CA-160 Northbound between Main St (Antioch) and Antioch Bridge - Toll Plaza (Oakley). All lanes closed. Expect delays",
    "event_type": "INCIDENT",
    "event_subtypes": [
      "Accident"
    ],
    "severity": "UNKNOWN",
    "created": "2014-05-01T19:28:31Z",
    "updated": "2014-05-01T19:28:31Z",
    "geography": {
      "type": "Point",
      "coordinates": [
        -121.753824,
        38.004908
      ]
    },
    "roads": [{
      "name": "CA-160",
      "from": "Main St",
      "to": "Antioch Bridge - Toll Plaza",
      "direction": "NorthBound",
      "state": "Open",
      "+lane_type": "All Lanes",
      "+article": "between",
      "+road_advisory": "Expect delays",
      "+lane_status": "closed"
    }],
    "areas": [
      {
        "url": "http://geonames.org/5324200/",
        "name": "Antioch",
        "id": "geonames.org/5324200"
      },
      {
        "url": "http://geonames.org/5378566/",
        "name": "Oakley",
        "id": "geonames.org/5378566"
      }
    ]
  },
  "schedules": [{
    "start_date": "2014-05-01"
  }],
  "+source_id": "1234",
  "+source_name": "CHP",
  "+closure_geography": {
    "type": "MultiLineString",
    "coordinates": [

```



```
[
  [
    -121.965344339091,
    38.0227069562185
  ],
  [
    -121.965265000299,
    38.0226909996807
  ],
  [
    -121.964901000251,
    38.0226219996731
  ],
  [
    -121.963347999975,
    38.0223280002051
  ],
  [
    -121.963122999844,
    38.0222860001848
  ],
  [
    -121.962568,
    38.0221690001024
  ],
  [
    -121.962037000446,
    38.0220539997063
  ],
  [
    -121.961545000351,
    38.0219580000743
  ],
  [
    -121.960780000445,
    38.0218160002701
  ],
  [
    -121.960453000207,
    38.0217570002606
  ],
  [
    -121.960274000107,
    38.0217250000316
  ]
]
}
},
{
  "url": "/traffic/events/511.org/209",
  "jurisdiction_url": "http://api.511.org/jurisdictions/511.org/",
  "id": "511.org/209",
  "status": "ACTIVE",
  "headline": "CHP : Obstruction on US-101 N NorthBound before Coyote Creek Golf Dr  
(San Jose) left lane blocked Expect delays",
  "event_type": "INCIDENT",
  "severity": "UNKNOWN",
  "created": "2014-05-02T01:13:55Z",
}
```



```
"updated": "2014-05-02T02:43:16Z",
"geography": {
  "type": "Point",
  "coordinates": [
    -121.693464,
    37.19068
  ]
},
"roads": [{
  "name": "US-101 N",
  "from": "Coyote Creek Golf Dr",
  "to": "",
  "direction": "NorthBound",
  "state": "Open"
}],
"schedules": [{
  "start_date": "2014-05-01"
}]
}
],
"pagination": {
  "next_url": "/traffic/events/?api_key={api_key}&limit=2&offset=2",
  "offset": 0
},
"meta": {
  "url": "traffic/events/?api_key={api_key}&limit=2&offset=0",
  "up_url": "/",
  "version": "v1"
}
}
```

4.2 Work Zone Data Exchange (WZDx) JSON

B.2.1 Example Work Zone Data Exchange Structure Response (JSON)

```
{
  "road_event_feed_info": {
    "publisher": "MTC",
    "version": "4.0",
    "license": "https://creativecommons.org/publicdomain/zero/1.0/",
    "update_frequency": 300,
    "contact_name": "511 SF Bay",
    "contact_email": "trafficdata@511.org",
    "update_date": "2023-10-13T18:55:42Z",
    "data_sources": [
      {
        "update_date": "2023-10-12T20:00:35Z",
        "data_source_id": "SF-2",
        "jurisdiction_id": "3",
        "organization_name": "SFMTA",
        "update_frequency": 1440,
        "contact_name": "SpecialEvents",
        "contact_email": "SpecialEvents@sfmta.com"
      },
      {
        "update_date": "2022-12-30T18:53:50Z",
        "data_source_id": "CSC-255998",
        "jurisdiction_id": "8",
        "organization_name": "County of Santa Clara - Roads and Airports Department",

```

```

    "update_frequency": 0,
    "contact_name": "Thien Pham",
    "contact_email": "thien.pham@rda.sccgov.org"
  },
  {
    "update_date": "2023-01-05T20:41:39Z",
    "data_source_id": "SL-889351",
    "jurisdiction_id": "7",
    "organization_name": "City of San Leandro",
    "update_frequency": 0,
    "contact_name": "Sheila Marquises",
    "contact_email": "smarquises@sanleandro.org"
  },
  {
    "update_date": "2023-10-12T07:10:19Z",
    "data_source_id": "SJ-1",
    "jurisdiction_id": "2",
    "organization_name": "City of San Jose Department of Public Works",
    "update_frequency": 1440,
    "contact_name": "Cone Zone Application",
    "contact_email": "joel.clark@sanjoseca.gov"
  },
  {
    "update_date": "2023-10-06T07:10:27Z",
    "data_source_id": "SJ-2",
    "jurisdiction_id": "2",
    "organization_name": "City of San Jose Department of Transportation",
    "update_frequency": 1440,
    "contact_name": "Current Pavement Projects",
    "contact_email": "jay.vanbiljouw@sanjoseca.gov"
  },
  {
    "update_date": "2023-10-13T18:45:00Z",
    "data_source_id": "TM-1",
    "jurisdiction_id": "1",
    "organization_name": "TRAMS",
    "update_frequency": 300,
    "contact_name": "511 SF Bay",
    "contact_email": "trafficdata@511.org"
  }
]
},
"type": "FeatureCollection",
"features": [
  {
    "type": "Feature",
    "id": "SF-744117-9738000-3279938",
    "geometry": {
      "type": "LineString",
      "coordinates": [
        [
          -122.43270618000003,
          37.78329259200001
        ],
        [
          -122.43435039600001,
          37.783083017000024
        ]
      ]
    }
  }
]

```




```
    },
    "properties": {
      "core_details": {
        "event_type": "detour",
        "data_source_id": "SF-2",
        "road_names": [
          "OFARRELL ST"
        ],
        "direction": "undefined",
        "creation_date": "2023-10-12T20:19:36Z",
        "update_date": "2023-10-13T18:45:22Z"
      },
      "start_date": "2023-10-15T11:00:00Z",
      "end_date": "2023-10-15T18:00:00Z",
      "event_status": "pending",
      "start_date_accuracy": "estimated",
      "end_date_accuracy": "estimated",
      "beginning_cross_street": "FILLMORE ST",
      "ending_cross_street": "STEINER ST"
    }
  },
  {
    "type": "Feature",
    "id": "SJ-4167_WB",
    "geometry": {
      "type": "LineString",
      "coordinates": [
        [
          -121.8398006,
          37.3497991
        ],
        [
          -121.8411417,
          37.348861
        ],
        [
          -121.8411525,
          37.3486136
        ],
        [
          -121.8451007,
          37.3457137
        ]
      ]
    },
    "properties": {
      "core_details": {
        "event_type": "work-zone",
        "data_source_id": "SJ-1",
        "road_names": [
          "LAVONNE AVE"
        ],
        "direction": "westbound",
        "creation_date": "2023-05-11T07:11:01Z",
        "update_date": "2023-10-13T18:45:01Z",
        "description": "Utility potholing"
      },
      "start_date": "2023-05-10T15:15:00Z",
      "end_date": "2023-12-31T00:15:00Z",
```



```
"event_status": "active",
"start_date_accuracy": "estimated",
"end_date_accuracy": "estimated",
"beginning_accuracy": "estimated",
"ending_accuracy": "estimated",
"location_method": "channel-device-method",
"vehicle_impact": "unknown",
"beginning_cross_street": "MCCREERYAVE",
"ending_cross_street": "SINCLAIR AVE"
}
},
{
  "type": "Feature",
  "id": "CSC-1688067095810",
  "geometry": {
    "type": "LineString",
    "coordinates": [
      [
        -122.016954,
        37.167567999999996
      ],
      [
        -122.016893,
        37.167657
      ],
      [
        -122.016758,
        37.167845
      ],
      [
        -122.016618,
        37.168115
      ],
      [
        -122.016556999999999,
        37.168264
      ]
    ]
  },
  "properties": {
    "core_details": {
      "event_type": "work-zone",
      "data_source_id": "CSC-255998",
      "road_names": [
        "Bear Creek Road"
      ],
      "direction": "undefined",
      "creation_date": "2023-06-29T19:31:35Z",
      "update_date": "2023-06-29T19:31:35Z",
      "description": "One lane closed on Bear Creek Road 700' north of Highway 35"
    },
    "start_date": "2023-02-01T20:30:57Z",
    "end_date": "2023-11-30T20:31:02Z",
    "event_status": "active",
    "start_date_accuracy": "estimated",
    "end_date_accuracy": "estimated",
    "beginning_accuracy": "verified",
    "ending_accuracy": "verified",
    "location_method": "other",
```



```
"vehicle_impact": "alternating-one-way",
"beginning_cross_street": "Highway 35",
"ending_cross_street": "George Road",
"worker_presence": {
  "are_workers_present": false
}
},
{
  "type": "Feature",
  "id": "TM-231009GG01893-1104046",
  "geometry": {
    "type": "MultiPoint",
    "coordinates": [
      [
        -122.4409,
        37.9349
      ],
      [
        -122.4409,
        37.9349
      ]
    ]
  },
  "properties": {
    "core_details": {
      "event_type": "work-zone",
      "data_source_id": "TM-1",
      "road_names": [
        "I-580 W"
      ],
      "direction": "westbound",
      "creation_date": "2023-10-13T04:30:06Z",
      "update_date": "2023-10-13T04:30:06Z",
      "description": "CHP : Severe traffic alert on I-580 Westbound at Richmond San
Rafael Bridge (Richmond). Lanes open. Expect delays."
    },
    "start_date": "2023-10-10T10:21:33Z",
    "end_date": "2023-10-11T06:59:59Z",
    "event_status": "completed",
    "start_date_accuracy": "verified",
    "end_date_accuracy": "estimated",
    "beginning_accuracy": "verified",
    "ending_accuracy": "estimated",
    "location_method": "unknown",
    "vehicle_impact": "unknown",
    "beginning_cross_street": "Richmond San Rafael Bridge",
    "worker_presence": {
      "are_workers_present": false
    }
  }
},
{
  "type": "Feature",
  "id": "SF-773945-4312000-3287485",
  "geometry": {
    "type": "LineString",
    "coordinates": [

```



```
-122.4014037960001,  
37.7944268460002  
  ],  
  [  
    -122.40226452799999,  
    37.794315756  
  ]  
],  
},  
"properties": {  
  "core_details": {  
    "event_type": "detour",  
    "data_source_id": "SF-2",  
    "road_names": [  
      "COMMERCIAL ST"  
    ],  
    "direction": "undefined",  
    "creation_date": "2023-10-12T20:20:19Z",  
    "update_date": "2023-10-13T18:45:24Z"  
  },  
  "start_date": "2023-11-23T07:00:00Z",  
  "end_date": "2023-11-23T23:00:00Z",  
  "event_status": "pending",  
  "start_date_accuracy": "estimated",  
  "end_date_accuracy": "estimated",  
  "beginning_cross_street": "SANSOME ST",  
  "ending_cross_street": "LEIDESDORFF ST"  
}  
},  
{  
  "type": "Feature",  
  "id": "SJ-4738_SB",  
  "geometry": {  
    "type": "LineString",  
    "coordinates": [  
      [  
        -121.8406038,  
        37.3554893  
      ],  
      [  
        -121.8426906,  
        37.357681  
      ]  
    ]  
  },  
  "properties": {  
    "core_details": {  
      "event_type": "work-zone",  
      "data_source_id": "SJ-1",  
      "road_names": [  
        "S JACKSON AVE"  
      ],  
      "direction": "southbound",  
      "creation_date": "2023-07-14T07:11:01Z",  
      "update_date": "2023-10-13T18:45:01Z",  
      "description": "Utility repair"  
    },  
    "start_date": "2023-07-18T15:30:00Z",  
    "end_date": "2023-12-30T23:30:00Z",
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```
"event_status": "active",  
  "start_date_accuracy": "estimated",  
  "end_date_accuracy": "estimated",  
  "beginning_accuracy": "estimated",  
  "ending_accuracy": "estimated",  
  "location_method": "channel-device-method",  
  "vehicle_impact": "unknown",  
  "beginning_cross_street": "E SAN ANTONIO AVE",  
  "ending_cross_street": "WOODSET LN"  
}  
]  
}
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