ExMAS Transitize

Illustration and results

1. parameters for expiermental setting
2. system-wide KPIs
3. illustrative example

Parameters and settings

In [1]:

```
%load_ext autoreload
%autoreload 2
import os
import seaborn as sns
os.chdir(os.path.join(os.getcwd(),'../../..'))
import ExMAS.main
from ExMAS.utils import *
from ExMAS.transitize import visualizations
params = ExMAS.utils.get_config('ExMAS/data/configs/transit.json')
inData = ExMAS.utils.load_G(inData, params, stats=True)
```

In [2]:

```
params.nP = 600  # number of trips
params.simTime = 0.2  # per simTime hours
params.mode_choice_beta = -0.3  # only to estimate utilities of pickup points

params.VoT = 0.0035  # value of time (eur/second)
params.VoT_std = params.VoT / 8  # variance of Value of Time

params.speeds.walk = 1.2  # speed of walking (m/s)
params.speeds.ride = 7 # in-vehicle speed

params.walk_discomfort = 1  # walking discomfort factor (to be made 1.5 or 2.0 later)
params.walk_threshold = 400  # maximal walking distance (per origin or destination)

params.price = 1.5  # per kilometer fare (eur)
params.shared_discount = 0.25 # discount for door to door pooling (1.2eur)
params.s2s_discount = 0.66  # discount for stop to stop pooling (50c)
params.multistop_discount = 0.8  # discount for multi-stop (30c)

params.multi_stop_WtS = 1  # willingness to share in multi-stop pooling (now lower)
```

Results (KPI)

In [19]:

```
inData = visualizations.prep_results(PATH='ams', inData = inData)
inData = visualizations.make_report(inData)
```

In [22]:

```
report = inData.transitize.report
report.columns = ['private','door-to-door pooled','stop-to-stop pooled','multi-stop pooled']
compos = report.loc[['p','d2d','s2s','ms']].fillna(0).astype(int).T
compos.columns = ['private','door-to-door pooled','stop-to-stop pooled','multi-stop pooled']
compos.index.name = 'solution'
compos.style.set_caption("Rides composition")
```

Out[22]:

Rides composition

	private	door-to-door pooled	stop-to-stop pooled	multi-stop pooled
solution				
private	500	0	0	0
door-to-door pooled	93	164	0	0
stop-to-stop pooled	95	153	10	0
multi-stop pooled	94	150	2	7

In [24]:

```
KPIs = report.loc[['u_veh','u_pax','ttrav','orig_walk_time','dest_walk_time', 'nRides']].fillna(0).astype(int).T
KPIs.columns = ['vehicle hours','travellers costs (utility)','passenger in-vehicle hours','walk time origin', 'walk time destination', 'feasible rides']
KPIs.index.name = 'solution'
KPIs.style.set_caption("KPIs")
```

Out[24]:

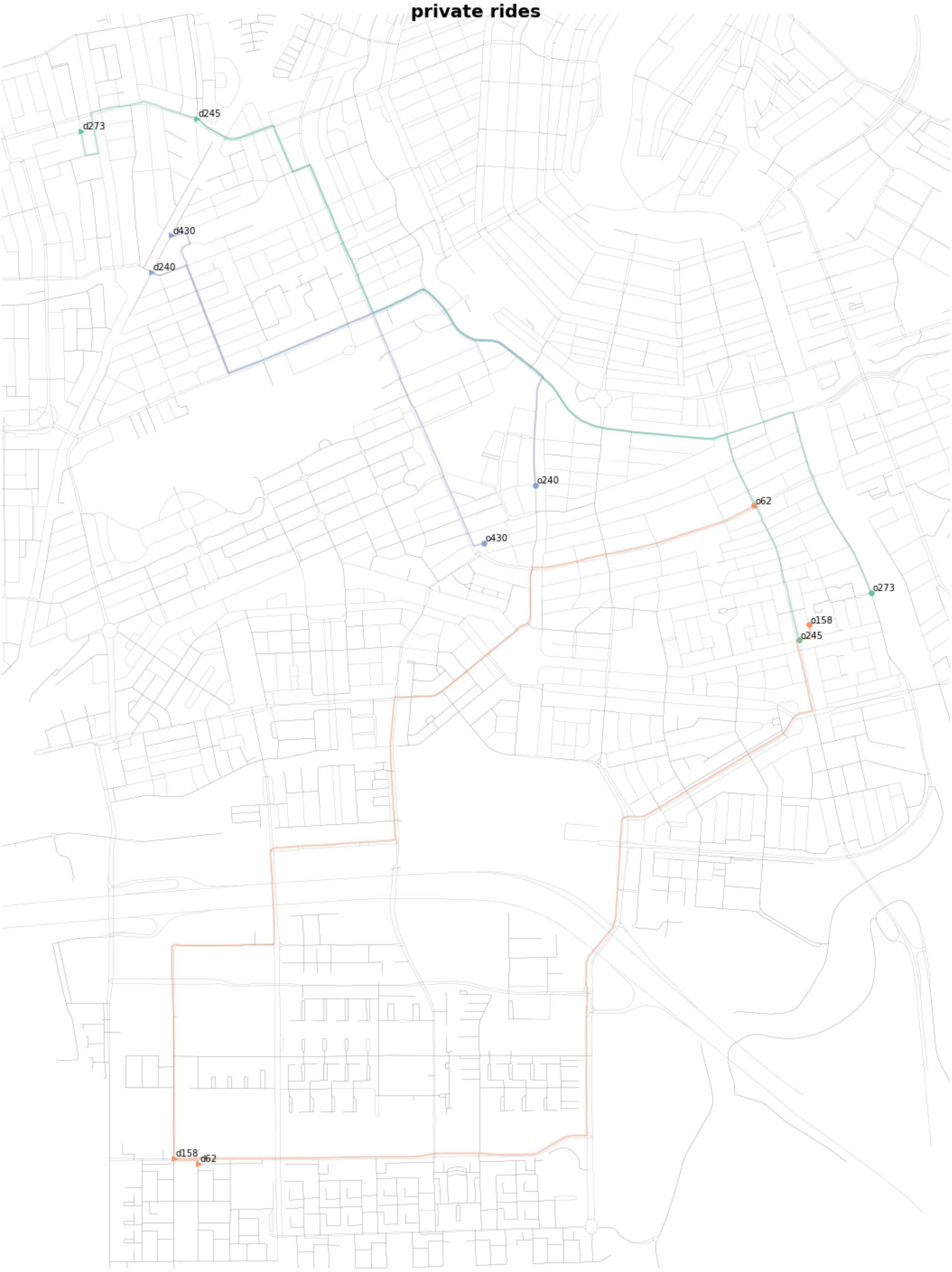
KPIs

	vehicle hours	travellers costs (utility)	passenger in-vehicle hours	walk time origin	walk time destination	feasible rides
solution						
private	321496	4980	321496	0	0	500
door-to-door pooled	217366	4771	410369	0	0	8281
stop-to-stop pooled	216778	4739	403717	4865	4340	8331
multi-stop pooled	215558	4652	399672	7486	5727	10759

Illustrative multi-stop ride

In [6]:

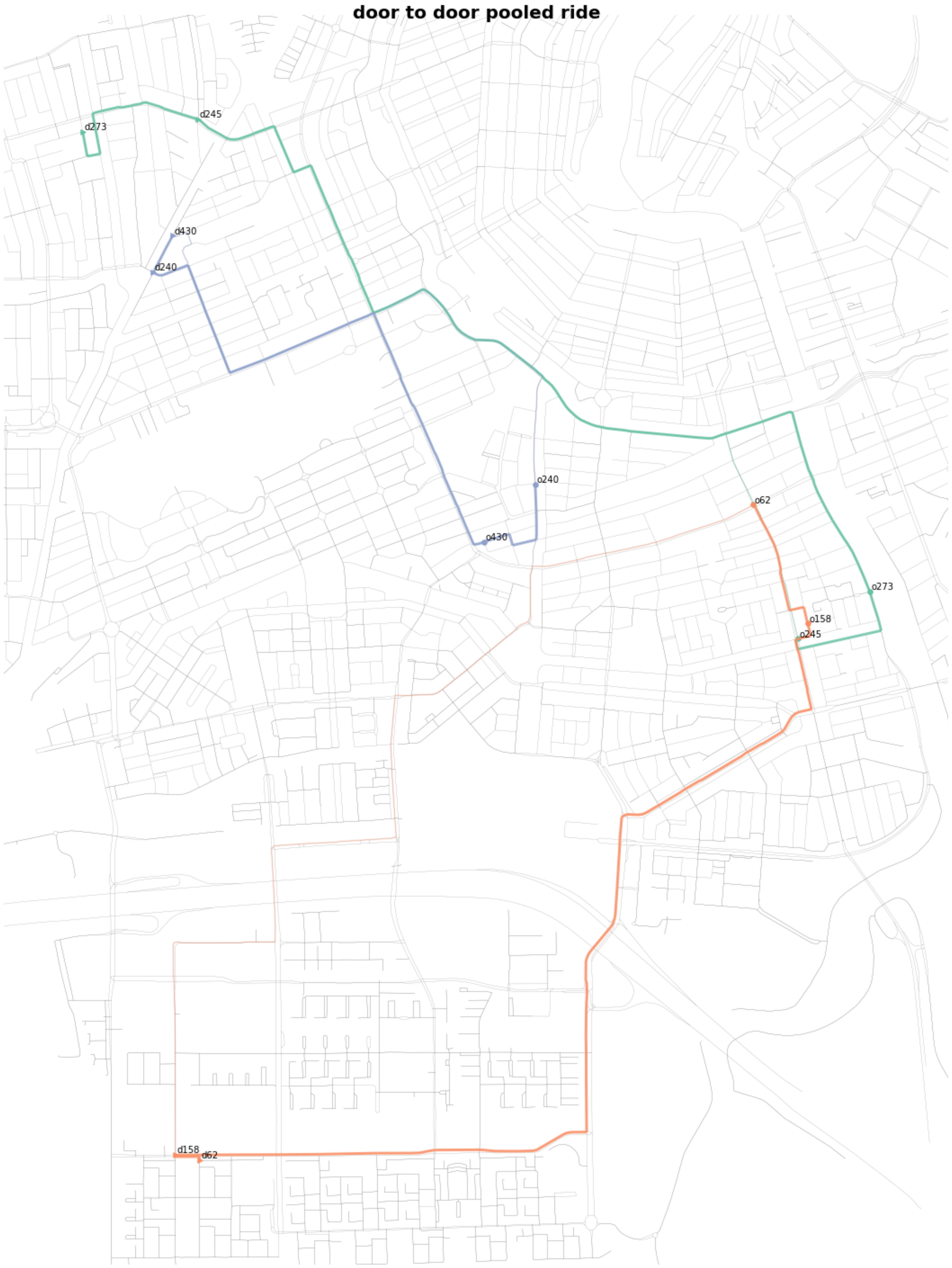
```
ride_index = 9149
visualizations.plot_ms(inData, ride_index, level = 0, title = 'private rides')
```



private rides

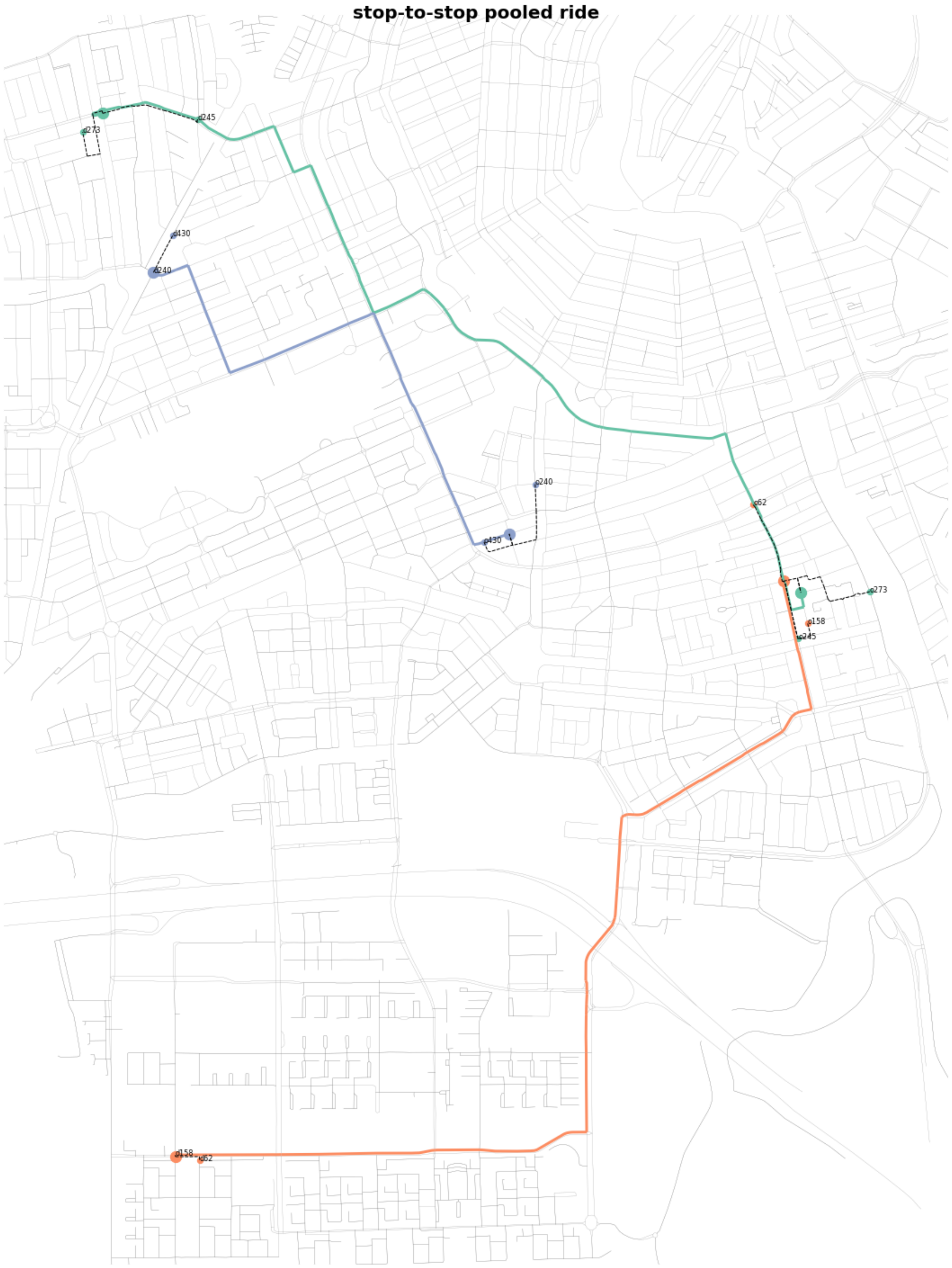
In [7]:

```
visualizations.plot_ms(inData, ride_index, level = 1, title = 'door to door pooled ride')
```



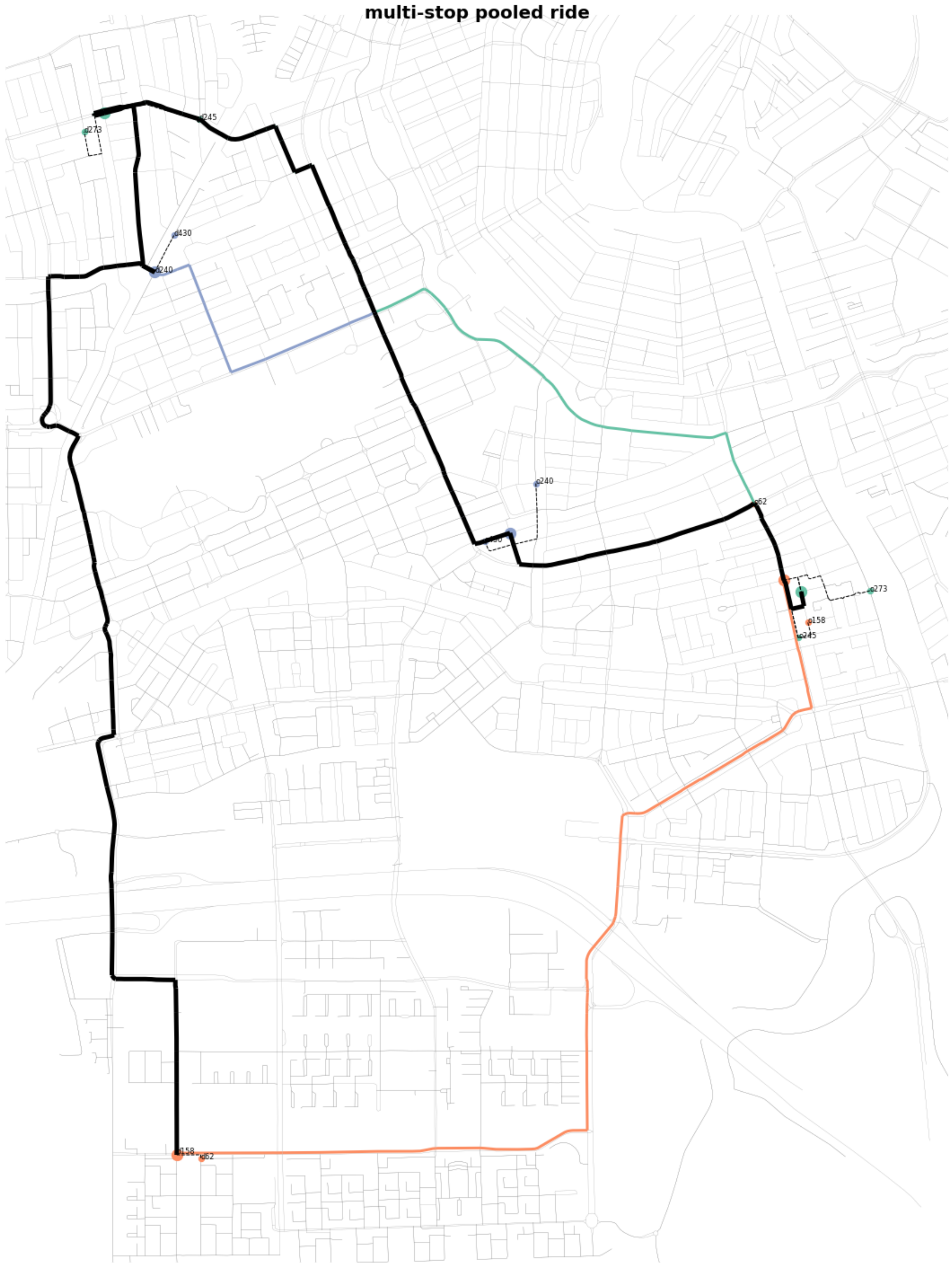
In [8]:

```
visualizations.plot_ms(inData, ride_index, level = 2, title = 'stop-to-stop pooled ride')
```



In [9]:

```
visualizations.plot_ms(inData, ride_index, level = 3, title = 'multi-stop pooled
ride')
```



Data on rides

In [10]:

```
ride_index = 9149
rides = inData.transitize.rides
requests = inData.transitize.requests

ride = inData.transitize.rides.loc[ride_index]
try:
    ride['high_level_indexes'] = json.loads(ride['high_level_indexes'])
except:
    pass
ride['origins'] = requests.loc[ride.indexes].origin.values
ride['destinations'] = requests.loc[ride.indexes].destination.values

private_rides = rides[rides.kind=='p'][rides['index'].isin(ride.indexes)]

s2s_rides = rides.loc[ride.high_level_indexes]

d2d_rides = rides.loc[s2s_rides.d2d_reference.values]
```

In [11]:

```
private_rides.style.set_caption("Private rides")
```

Out[11]:

Private rides

	level_0	index	indexes	indexes_orig	indexes_dest	u_pax	u_veh	kind	
62	62	62.000000	[62]	[62]	[62]	9.923126	664.000000	p	6
158	158	158.000000	[158]	[158]	[158]	9.899972	614.000000	p	6
240	240	240.000000	[240]	[240]	[240]	5.666961	361.000000	p	3
245	245	245.000000	[245]	[245]	[245]	8.830251	547.000000	p	5
273	273	273.000000	[273]	[273]	[273]	10.626044	683.000000	p	6
430	430	430.000000	[430]	[430]	[430]	5.388863	341.000000	p	3

In [12]:

```
d2d_rides.style.set_caption("Door-to-door rides")
```

Out[12]:

Door-to-door rides

	level_0	index	indexes	indexes_orig	indexes_dest	u_pax	u_veh	kinc
2124.0	2124	2124.000000	[245, 273]	[245, 273]	[245, 273]	18.217090	762.000000	d2c
3286.0	3286	3286.000000	[62, 158]	[62, 158]	[158, 62]	18.052043	714.000000	d2c
2107.0	2107	2107.000000	[240, 430]	[240, 430]	[240, 430]	10.968870	421.000000	d2c

In [13]:

```
s2s_rides.style.set_caption("Stop-to-stop rides")
```

Out[13]:

Stop-to-stop rides

	level_0	index	indexes	indexes_orig	indexes_dest	u_pax	u_veh	kind
8297	8297	2124.000000	[245, 273]	nan	nan	17.201110	670.000000	s2s
8309	8309	3286.000000	[62, 158]	nan	nan	14.610193	727.000000	s2s
8296	8296	2107.000000	[240, 430]	nan	nan	9.508813	438.000000	s2s

In [14]:

```
ride.to_frame().T.style.set_caption("Multi-stop ride")
```

Out[14]:

Multi-stop ride

	level_0	index	indexes	indexes_orig	indexes_dest	u_pax	u_veh	kind	
9149	818	nan	[245, 273, 62, 158, 240, 430]	[8297, 8309, 8296]	[8297, 8296, 8309]	21.843824	1415.000000	ms	1835