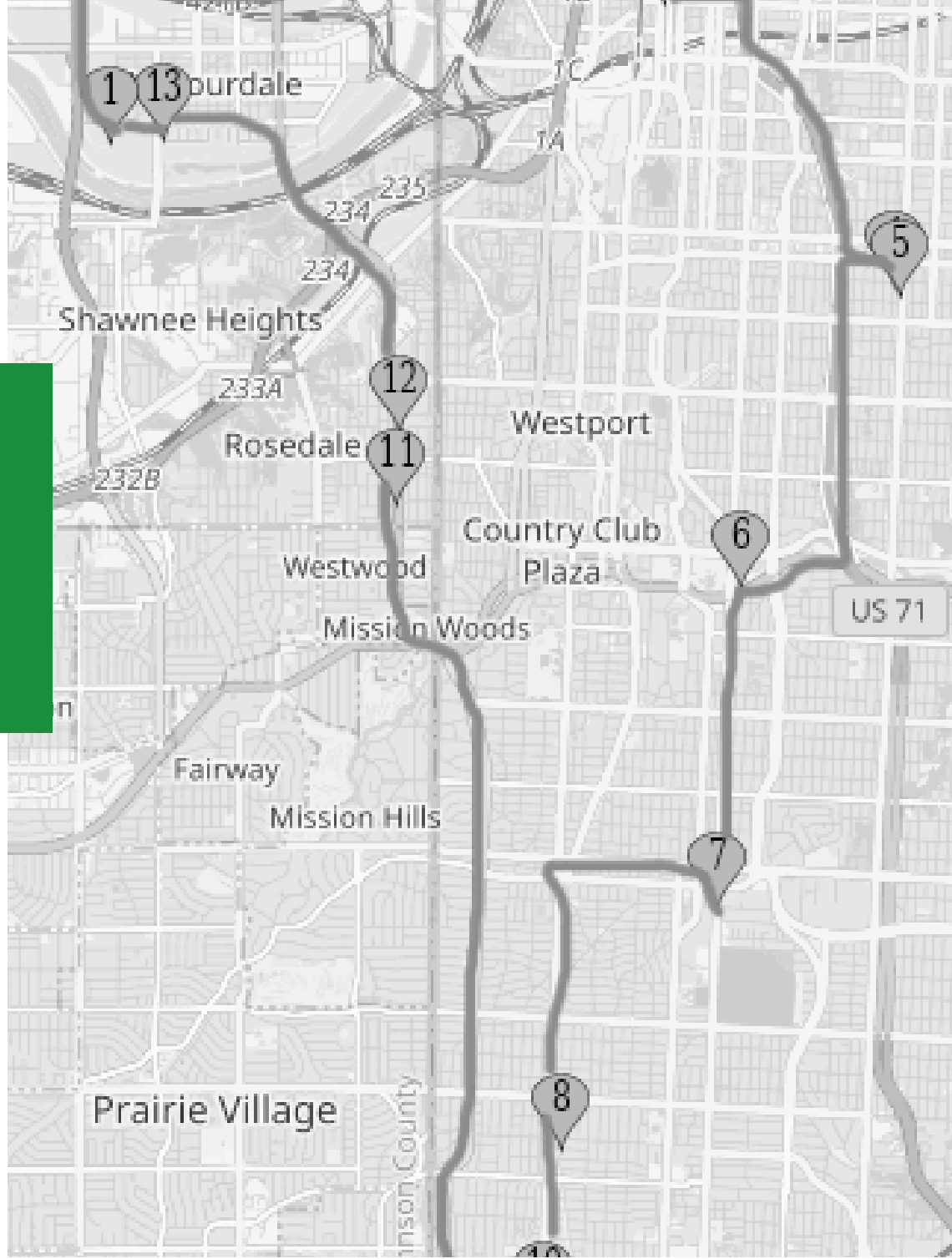**NT LOGISTICS®**

PREPARED BY NT LOGISTICS
ANALYTICS TEAM

A ROUTE
SEQUENCING
EXPLORATION

ROUTE EFFICIENCY ANALYSIS

We are pleased to present a case study focused on optimizing the delivery operations of a leading food distribution company.

This study examines the complexities of the client's delivery operations with the goal of identifying opportunities for optimization and efficiency improvements.

Our analysis revealed opportunities for improved efficiency in routing models while maintaining high customer service standards.

Through this case study, we hope to showcase our expertise which we believe can directly benefit your logistics strategy, optimizing your operations, and driving success for your business.

LYNN GRAVLEY

President and CEO
NT Logistics

THE BACKGROUND

NT Logistics was provided with four weeks of data from early 2022. Our goal was to search for potential optimization opportunities given the information we were provided.

First, to gain a full understanding of the scenario, we modeled out the stops as close to the original data as provided. We call this "**As Routed**."

AS ROUTED DATA

- Our analysis does not include dwell time nor restrictions

- Informed that client utilized 18 box trucks with 20,000 pound capacity per truck

- Duration, drive time, and cost weren't included in this analysis portion as our aim was to identify the exact mileage run

Second, we took the As Routed data and simply changed the sequence of the stops. We - cleverly - called this data "**Resequenced**."

Lastly, we allowed our Routing Optimization software and data analysts to run the model within a set of parameters. We called this data, "**Open**." In this scenario, orders can go on any truck, in any sequence, as long as it follows our parameters.

The parameters for the Open routing optimizations are below:

PARAMETERS FOR "OPEN" ROUTING OPTIMIZATION

DWELL

- PICKUP: Six minutes / 1,000 lbs
  Full capacity truck of 20,000 lbs = 2 hours

- DELIVERY: Ten minutes
  Deliveries often under 1,000 lbs, needing less time

DOT: Standard parameters
TRUCK COUNT: 18 box trucks
(Parameter set to 18. Only 13 needed in model)
WEIGHT: 20,000 lb capacity

SPEED: Calculated using table below. The average speed is 37 MPH.

MILEAGE SPLIT: Two batches

- Over 400 miles roundtrip. Include DOT rest and break restrictions as they are likely to run over 11 hour driver time max. Maximum 35 hour trip allowance

- Under 400 miles roundtrip. Include DOT break but not rest times as trip time is restricted to 11 hours

OPENING HOURS

DELIVERY: Weekdays, 8am to 5pm
ORIGIN: Weekdays, 6am to 7pm
TRUCK: Weekdays, 6am to 7pm

|	Highways	Fast Roads	Truck Roads / Fed Highways	Major Roads	Minor Roads	Residential Roads
High	84	75	65	62	59	31
Low	43	24	19	16	12	6

THE RESULTS

Taking the same number of trucks, trip count, and stops and resequencing the stops led to reduction in mileage of 8.7%.

When we opened up the parameters, NT Logistics was able to increase the savings to 22.6%* in miles.

RESEQUENCED

8.7%

Reduction in Mileage

*REALISTICALLY

While it is interesting to get a view of "nirvana" we realize that the real world exists within the confines of certain parameters and limitations.

OPEN

22.6%

Reduction in Mileage

25		
20		
15		
10		
5		
0		
Resequenced	X	Open
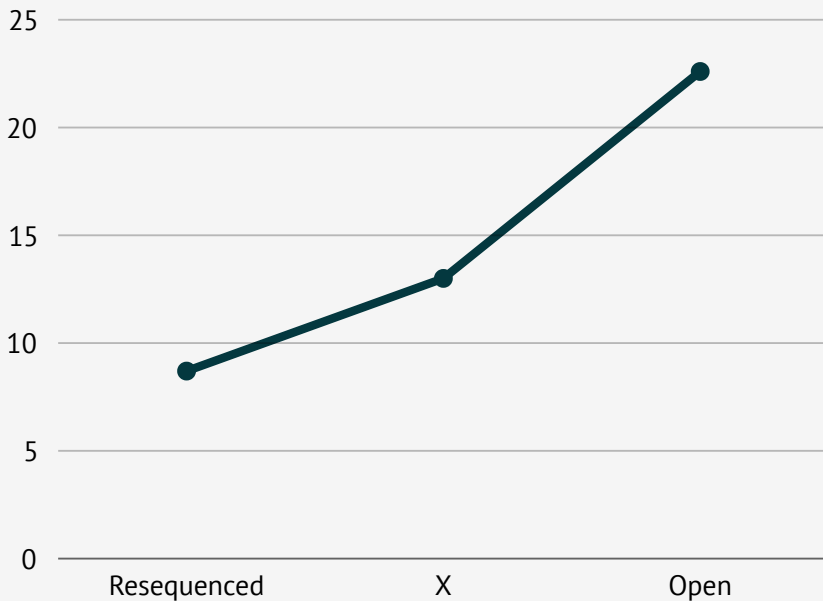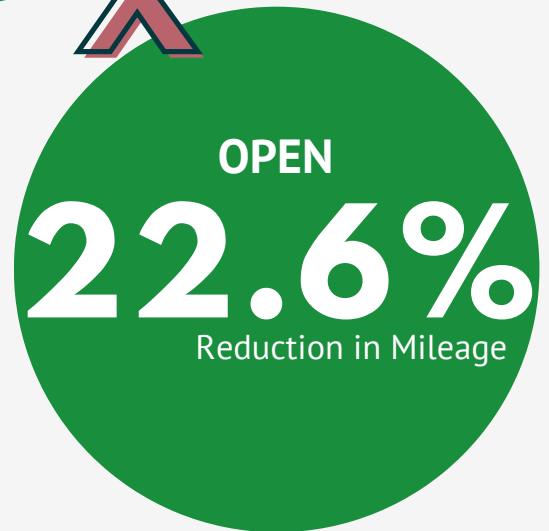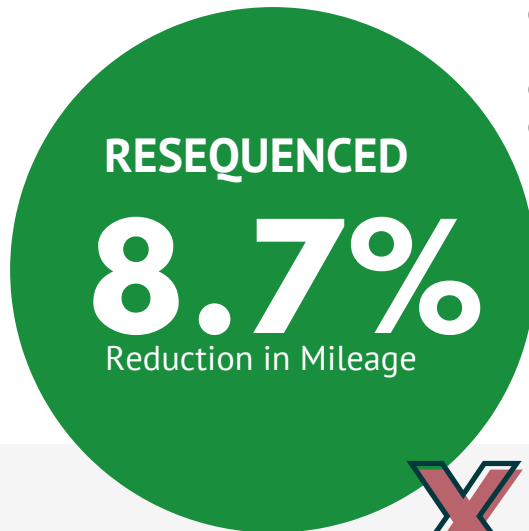
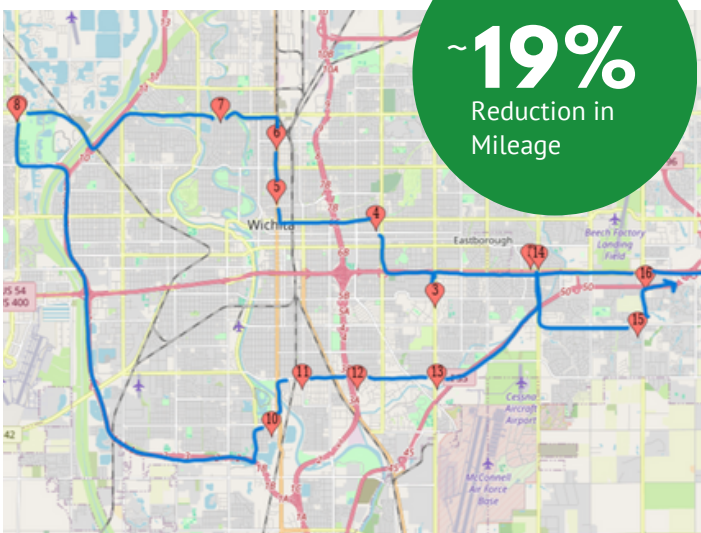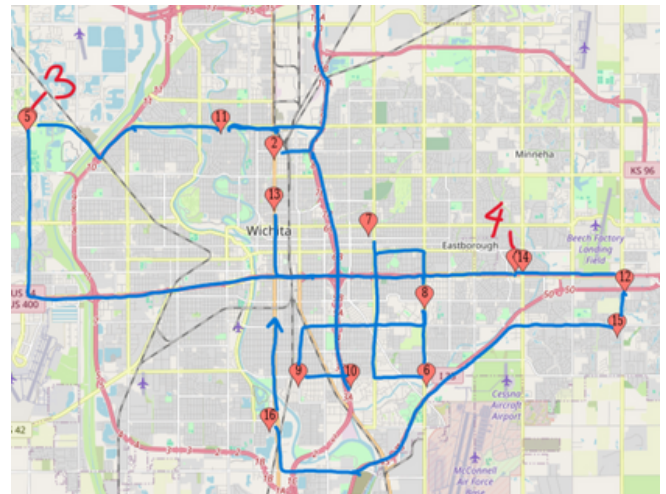## AS ROUTED

No	Arrival	Site Name	Departure	Distance
0	07:17	Client	07:47	0 mi
1	10:42	Mariscos Cheli	10:52	196 mi
2	11:11	Emperor Japanese Grill	11:21	7 mi
3	11:38	Nori Japanese	11:48	13 mi
4	12:05	Pho Chopstick	12:15	13 mi
5	12:35	Panda Cafe	12:45	13 mi
6	12:56	Hibachi Boy Central	13:06	4 mi
7	13:14	Ah So	13:24	3 mi
8	14:19	Kim Son Asian Market	14:29	5 mi
9	14:32	Pho Special	14:42	1 mi
10	14:53	Thai Binh Supermarket	15:03	6 mi
11	15:18	Tianluo Bistro	15:28	10 mi
12	15:44	Kimlan Sandwiches	15:54	9 mi
13	16:10	Thai Village	16:20	8 mi
14	16:26	Kim's Noodle Bar & Grill	16:36	2 mi
15	16:54	Kan-Grow Sprouts	17:04	15 mi
16	06:00	Client	06:00	200 mi
				507 mi

ONE.

For a more in-depth analysis, we pulled three routes from the dataset provided. The first route includes **15 stops**, originating from - and returning to - the client.

~19%
Reduction in Mileage

RESEQUENCED

No	Arrival	Site Name	Departure	Distance
0	07:01	Client	07:31	0 mi
1	10:14	Nori Japanese	10:24	189 mi
2	10:29	Ah So	10:39	2 mi
3	10:46	Hibachi Boy Central	10:56	3 mi
4	11:06	Kimlan Sandwiches	11:16	2 mi
5	11:21	Mariscos Cheli	11:31	1 mi
6	11:34	Thai Binh Supermarket	11:44	1 mi
7	11:59	Pho Chopstick	12:09	6 mi
8	12:09	Emperor Japanese Grill	12:19	0 mi
9	13:21	Kan-Grow Sprouts	13:31	11 mi
10	13:36	Kim Son Asian Market	13:46	2 mi
11	13:49	Pho Special	13:59	1 mi
12	14:03	Panda Cafe	14:13	2 mi
13	14:18	Thai Village	14:28	2 mi
14	14:34	Kim's Noodle Bar & Grill	14:44	2 mi
15	14:46	Tianluo Bistro	14:56	1 mi
16	17:38	Client	17:38	188 mi
				413 mi

The **As Routed** data revealed a total distance of ~**507 miles** for the designated route. However, through NT's **resequencing** efforts, the route was efficiently optimized, resulting in a **reduced mileage of ~94 miles**. This marks a **decrease** of around **18.52% in total distance traveled.**
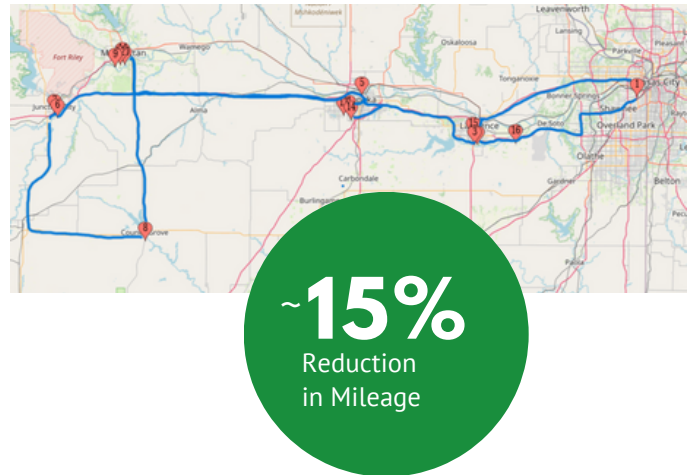
AS ROUTED

No	Arrival	Site Name	Departure	Distance
0	06:00	Client	06:30	0 mi
1	07:17	Tryyaki	07:27	40 mi
2	07:31	Little Saigon Cafe	07:41	2 mi
3	08:24	Seabrook Apple Market	08:34	35 mi
4	08:45	Meat Market Camecuaro	08:55	6 mi
5	09:52	Family Buffet	10:02	64 mi
6	10:08	Panda Palace	10:18	2 mi
7	11:06	Grand Fortuna	11:16	46 mi
8	12:00	Asian Market	12:10	40 mi
9	12:14	Mayte Cazares	12:24	2 mi
10	12:28	Green Tea Sushi	12:38	1 mi
11	13:29	Baan Thai	13:39	1 mi
12	14:30	Kiku Steak House	14:40	54 mi
13	14:46	Saigon	14:56	3 mi
14	15:27	Red Pepper	15:37	30 mi
15	15:58	Jasmin	16:08	13 mi
16	16:45	Client	16:45	33 mi
				372 mi

TWO.

The second analysis involves **15 stops**, again originating from - and returning to - the client.

~15%
Reduction in Mileage

The **As Routed** data revealed a total distance of ~**372 miles** for the designated route. However, through NT's **resequencing** efforts, the route was efficiently optimized, resulting in a **reduced mileage of** ~**55 miles**. This marks a **decrease** of around **14.79% in total distance traveled.**

RESEQUENCED

No	Arrival	Site Name	Departure	Distance
0	06:00	Client	06:30	0 mi
1	08:18	Grand Fortuna	08:28	117 mi
2	09:07	Mayte Cazares	09:17	38 mi
3	09:22	Green Tea Sushi	09:32	1 mi
4	09:37	Baan Thai	09:47	1 mi
5	09:49	Asian Market	09:59	1 mi
6	10:20	Panda Palace	10:30	18 mi
7	10:36	Family Buffet	10:46	2 mi
8	11:39	Kiku Steak House	11:49	60 mi
9	11:53	Seabrook Apple Market	12:03	1 mi
10	12:06	Saigon	12:16	2 mi
11	12:31	Meat Market Camecuaro	12:41	6 mi
12	13:54	Red Pepper	14:04	26 mi
13	14:12	Tryyaki	14:22	3 mi
14	14:25	Little Saigon	14:35	2 mi
15	14:47	Jasmin	14:57	7 mi
16	15:34	Client	15:34	33 mi
				317 mi

AS ROUTED

No	Arrival	Site Name	Departure	Distance
0	15:02	Client	15:32	0 mi
1	05:55	China Go	06:10	193 mi
2	06:22	Master Wok	06:42	11 mi
3	06:49	Hibachi Boy Central	06:59	4 mi
4	07:11	Lucky Market	07:21	5 mi
5	07:34	Mariscos El Tucanazo	07:44	5 mi
6	07:50	Ming's	08:00	1 mi
7	08:14	Kim's Noodle Bar & Grill	08:24	10 mi
8	08:28	China Go Grill	08:38	2 mi
9	08:49	Xing Xing	08:59	7 mi
10	09:04	PHO KC	09:14	2 mi
11	09:15	Fried Rice	09:25	0 mi
12	09:38	Eggroll Express	09:48	4 mi
13	09:48	Kan-Grow Sprouts	09:58	0 mi
14	11:19	Ichiban Asian Bistro	11:29	90 mi
15	11:29	House of Ma	11:39	0 mi
16	13:04	Beijing	13:14	60 mi
17	15:42	Client	15:42	169 mi
				563 mi

~27%
Reduction
in Mileage

THREE.

The third analysis involves **16 stops**, originating from - and returning to - the client.
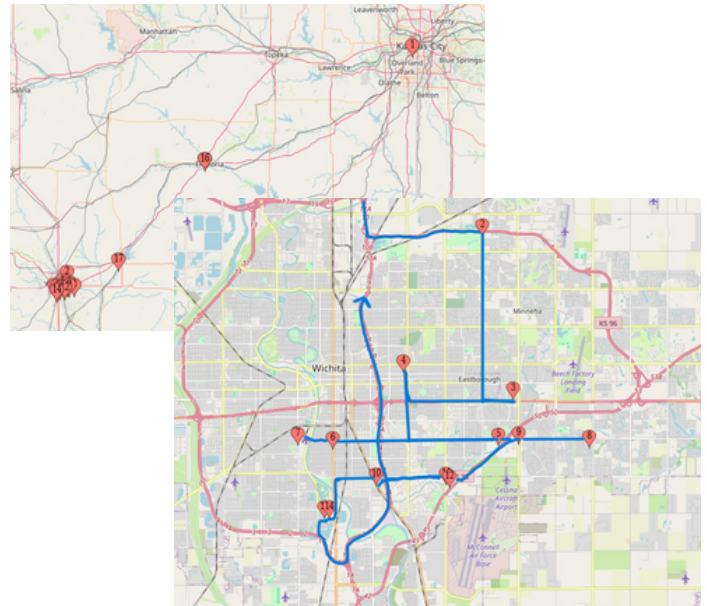
RESEQUENCED

No	Arrival	Site Name	Departure	Distance
0	14:42	Client	15:12	0 mi
1	18:00	China Go	18:10	193 mi
2	06:00	Hibachi Boy Central	06:10	8 mi
3	06:21	Marisco El Tucanazo	06:31	4 mi
4	06:36	Ming's	06:46	1 mi
5	06:53	Eggroll Express	07:03	3 mi
6	07:04	Kan-Grow Sprouts	07:14	0 mi
7	07:21	Xing Xing	07:31	2 mi
8	07:37	PHO KC	07:47	2 mi
9	07:47	Fried Rice	07:57	0 mi
10	08:02	Lucky Market	08:12	2 mi
11	08:17	Master Wok	08:37	2 mi
12	08:40	China Go Grill	08:50	1 mi
13	08:55	Kim's Noodle Bar & Grill	09:05	2 mi
14	09:29	Beijing	09:39	23 mi
15	10:32	House of Ma	10:42	59 mi
16	10:43	Ichiban Asian Bistro	10:53	0 mi
17	12:32	Client	12:32	108 mi
				411 mi
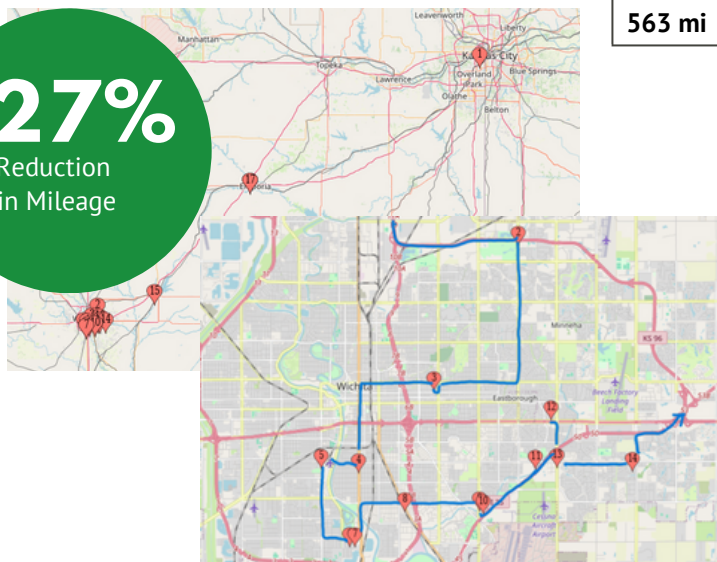
The initial **As Routed** data showed a route spanning roughly **563** miles. However, NT's resequencing efforts optimized the route, cutting it down by approximately **152** miles to around **26.98%** less distance covered.

SUMMARY

The above are just three examples from the data set we received from our client. As mentioned in the beginning of this study, the lower end of the mileage savings for this client was 8.7%, with the highest mileage with all parameters removed, was 22.6%.

While 22.6% can be seen as utopia, we know that our clients' customers *do* have parameters which need to be taken into consideration. In reality, the mileage savings will be somewhere in between the two numbers. The great news is that any way you look at it, we were able to save the client money.

X%
What is your actual mileage savings opportunity?

GETTING STARTED

We're excited about the prospect of working closely with you to enhance your logistics efficiency. Our team is committed to leveraging our expertise in route sequencing and optimization to drive tangible benefits for your operations. Together, we can uncover opportunities for significant mileage savings and operational improvements tailored to your specific needs.

It's simple and easy to get started.

Send us your stop data daily and we'll use our people and software to optimally sequence your stops.