DRAFT
MERGING NFRMPO AND DRCOG ZONE SYSTEMS AND NETWORKS

Zone System Merging

- Combined zone system numbering

Zone Number

	MPO Systems	Combined System
DRCOG	1—2664	1—2664
NFRMPO	1—815	2665—3479

- Overlap zones (see attached figure)
  - The twelve coincident polygons have the following ID numbers: 747, 699, 696, 695, 718,700 717, 707, 721, 756 in the NFR dataset, and ID numbers of 80202 and 80203 in the DRCOG dataset.
  - Eliminate 100% of socio-economic data in DRCOG zone 80202 (model zone 2576)
  - Reduce DRCOG socio-economic data in zone 80203 (model zone 2577) by amount of socio-economic data in NFRMPO zones 695, 707, 717, 718, 756

(See table on next page.)

- Internal-External activity to DRCOG zones 80202 (model zone 2576) and 80203 (model zone 2577)
  - Apportion I-E trip activity to these zones among remainder of DRCOG I-E zones

- Process Steps:
  - Split the DRCOG TAZ boundary ID 80203 where it is crossed by the NFR TAZ boundaries. Splitting the DRCOG TAZ boundary ID 80203 will result in two polygons. The southern polygon will retain the DRCOG ID and its attributes will be interpolated based on the original and new area. The northern polygon coincident with NFR TAZs will be removed.

Comparison of Socio-Economic Data in Overlapping Zones

Zone Number		DRCOG			NFRMPO			Difference DRCOG-NFRMPO			Combined Zone Systems
DRCOG	NFRMPO	Area (Sq. Mi.)	Total HH	Total Empl	Area (Sq. Mi.)	Total HH	Total Empl	Area (Sq. Mi.)	Total HH	Total Empl	Socio-Economics
80202 (model 2576)	696 699 747	15.92	780	261	15.84	779	226	0.08	1	35	• Retain 100% of NFRMPO socio-economic data • Remove 100% of DRCOG socio-economic data
80203 (model 2577)	695 707 717 718 756	151.0	1,711	1,550	72.65	1,282	1,529	78.35	429	21	• Retain 100% of NFRMPO socio-economic data • Reduce DRCOG socio-economics by NFRMPO amount

- The DRCOG TAZ boundary ID 80202 will be removed since it is coincident with the NFR TAZ ID's of 747, 696 and 699.
- One DRCOG TAZ will be split. (ID 80203)
- One DRCOG TAZ will be removed. (ID 80202)

Network Merging

- Retain external stations
- Move external stations so that overlapping links are reduced. Offset in network for visibility, as necessary.
- Unpaired external stations
  - Assume the three highways (I-25, US-287, US-85) are the only connections. Adjust trips on these roads to include adjacent unpaired external station activity.
  - Process Steps:

    Decision 1:
    1. NFR link 3680 connects to DRCOG node 5896 via new link.
    2. NFR node 7312 connects to DRCOG node 5896 via a new link.
    3. DRCOG centroid connector 19726 is offset from the planning network. DRCOG external node 2654 is offset from the planning network.
    4. The two new links have ID's of 29887 and 29886 in the combined model.

    Decision 2: (US 287)
    1. NFR link 8968 gets split at DRCOG node 7844.
    2. NFR external node 6622 is offset from the planning network.
    3. DRCOG centroid connector 19725 and DRCOG external node 2653 are offset from the planning network.

    Decision 3: (US 60 West to East)
    1. NFR centroid connector 3958 and external node 6635 are offset from the planning network.
    2. DRCOG link 24883 is removed and replaced by NFR link 3963.
    3. DRCOG link 24881 is replaced by NFR link 3591.

4. NFR link 3591 is split at DRCOG node 14676 and the resulting new link replaces DRCOG link 24888.
5. DRCOG link 11378 is removed and replaced by NFR link 8938.
6. DRCOG link 11380 is replaced by the NFR links 8948, 8319, 3457, 6947, 3475 and 3496.
7. DRCOG link 11410 is removed and replaced by NFR link 9584.

Decision 4: (I-25)

1. NFR link 3813 is moved to DRCOG node 7338 and offset from the planning network.
2. NFR link 3831 is moved to DRCOG node 7339 and offset from the planning network.
3. DRCOG links 11385,11411 and centroid connector 17923 is moved to NFR nodes 6236 and 6251 and are offset from the planning network.

Decision 5: (I-25 interchange with US 60)

1. NFR link 3405 is removed.
2. NFR link 3832 is removed.
3. NFR link 3406 is removed.
4. NFR link 3812 is removed.
5. NFR link 3810 is moved to DRCOG node 7342.
6. NFR link 3834 is moved to DRCOG node 7343.
7. NFR link 7720 is moved to NFR link 8945.
8. DRCOG link 11377 is removed.
9. DRCOG link 11384 is removed.
10. DRCOG link 11383 is removed.
11. DRCOG link 11385 is moved to NFR node 6236.
12. DRCOG link 11411 is moved to NFR node 6251.
13. DRCOG centroid connector 19724 is moved to NFR nodes 7342 and 7343.
14. A new link is placed connecting NFR nodes 3539 and DRCOG node 7341.

Decision 6: (US 85)

1. DRCOG link 11408 is removed.
2. DRCOG centroid connector 19723 and external node 2651 are moved to NFR node 3606.
3. NFR external node 3681 is offset from the planning network.

- External nodes in the NFR model do not connect to the rest of the network via centroid connectors, but rather by being the end node of a roadway. In the combined model, the NFR external stations that overlap with the DRCOG

model (Zone IDs 803, 806, 807, and 808) are connected to the network via centroid connectors. These connectors maintain the laneage and area type of the roadway link from the NFR model, but now have a facility type as a centroid connector (FT=8).

- Recode common links so that all nodes from either network are retained.
- Code common links so that link data is preserved from both networks.

    1. SH-66, an east-west facility in both models, was coded with link data from both models from County Line Road (SH-901) east to US-85.
    2. US-287 had a single link overlap. This link was coded with both model link data.

- Total linear mile overlap between the two models is 15.8 miles. 2.29 miles at US 285, 12.41 miles at US 60 and 1 mile at US 287.
- Add links where any gap between models may occur. This occurred only at the western edge of the model overlap. Two links () were coded into the network to represent CR-23 (N-S roadway) and one link () was coded to connect CR-4 (E-W roadway) to the new CR-23 links. Link data for these new links was borrowed from the adjacent CR-23 and CR-4 roadways in the NFR model.

DRCOG and NFR Link Variable Equivalency Table

DRCOG NFR Equivalency

Area Types (AT)

AT	DEF'N
1	CBD
2	Fringe
3	Urban
4	Suburban
5	Rural

AT	DEF'N
1	Rural
2	Suburban
3	Urban
4	Ft. Collins CBD
5	Other CBD

DRCOG AT	NFR AT
1	4,5
2	3
3	2
4	1
5	-

DRCOG's area type model should not be rerun. Changes in the NFR should probably done with a script or search and replace commands

Facility Types (FT)

FT	DEF'N
1	Freeway
2	Expressway
3	Major Arterial
4	Minor Arterial
5	Collector
6	Ramp
-	-
8	Cent. Collector

FT	DEF'N
1	Freeway
2	Expressway
3	Major Arterial
4	Minor Arterial
5	Collector
6	Ramp
7	Frontage Rd
8	Cent. Collector

DRCOG FT	NFR FT
1	1
2	2
3	3
4	4
5	5
6	6
	3
8	8

DRCOG does not currently use FT=7; NFR frontage road can be assumed to be a major arterial

VDF Parameters

These will fall into place by facilty type once the NFR links are assigned the DRCOG facilty type codes.

DRCOG

Capacities

	CBD	FRINGE	URBAN	SUB	RURAL
1	2000	2000	2000	2000	2000
2	800	1000	1250	1350	1400
3	600	850	950	950	1100
4	450	550	600	750	800
5	400	450	500	550	600
6	700	1100	1100	1100	1100
8					

FF Spd

	CBD	FRINGE	URBAN	SUB	RURAL
1	58	58	64	68	77
2	47	47	53	53	61
3	26	26	36	40	61
4	25	25	29	33	45
5	20	20	20	23	36
6	39	39	39	39	39
	41	41	31	36	48
8	11	13	16	28	28

NFR

Capacities

	CBD	FT CBD	URBAN	SUB	RURAL
1			1500	1500	1500
2	800		1000	1100	1200
3	700		800	800	800
4	435		550	550	550
5	435		400	400	400
6	800		800	800	800
7	550		550	550	550
8					

FF Spd

	CBD	FT CBD	URBAN	SUB	RURAL
1					75
2	40		45	55	60
3	26		34	46	57
4	17		35	42	48
5	15		25	30	35
6	30		30	30	30
7	32		32	32	32
8	16		16	21	35

diff btwn capacities

frin - urb	urb - urb	urb-sub	sub-sub	sub-rur	rur-rur
500	500	500	500	500	500
0	250	150	250	150	200
50	150	150	150	150	300
0	50	50	200	200	250
50	100	100	150	150	200
300	300	300	300	300	300
900	1350	1250	1550	1450	1750

diff btwn ff speeds

frin - urb	urb - urb	urb-sub	sub-sub	sub-rur	rur-rur
2	8	-2	-2	-7	2
-8	2	-10	-6	-7	1
-10	-6	-13	-9	-17	4
-5	-5	-10	-7	-15	-3
9	9	9	9	-12	1
9	-1	-1	4	9	9
-3	0	-5	7	4	16
-6	7	-32	-4	-45	30

DRCOG fringe = NFR Urban
DRCOG urban = NFR Suburban
DRCOG suburban = NFR rural

DRCOG

Capacities

	CBD	FRINGE	URBAN	SUB	RURAL
1	2000	2000	2000	2000	2000
2	800	1000	1250	1350	1400
3	600	850	950	950	1100
4	450	550	600	750	800
5	400	450	500	550	600
6	700	1100	1100	1100	1100
8					

NFR

	CBD	FT CBD	URBAN	SUB	RURAL
1			1500	1500	1500
2	800		1000	1100	1200
3	700		800	800	800
4	435		550	550	550
5	435		400	400	400
6	800		800	800	800
7	550		550	550	550
8					

FF Spd

	CBD	FRINGE	URBAN	SUB	RURAL
1	58	58	64	68	77
2	47	47	53	53	61
3	26	26	36	40	61
4	25	25	29	33	45
5	20	20	20	23	36
6	39	39	39	39	39
	41	41	31	36	48
8	11	13	16	28	28

	CBD	FT CBD	URBAN	SUB	RURAL
1					75
2	40		45	55	60
3	26		34	46	57
4	17		35	42	48
5	15		25	30	35
6	30		30	30	30
7	32		32	32	32
8	16		16	21	35

diff btwn capacities

frin - urb	urb - urb	urb-sub	sub-sub	sub-rur	rur-rur
500	500	500	500	500	500
0	250	150	250	150	200
50	150	150	150	150	300
0	50	50	200	200	250
50	100	100	150	150	200
300	300	300	300	300	300
900	1350	1250	1550	1450	1750

diff btwn ff speeds

frin - urb	urb - urb	urb-sub	sub-sub	sub-rur	rur-rur
2	8	-2	-2	-7	2
-8	2	-10	-6	-7	1
-10	-6	-13	-9	-17	4
-5	-5	-10	-7	-15	-3
9	9	9	9	-12	1
9	-1	-1	4	9	9
-3	0	-5	7	4	16
-6	7	-32	-4	-45	30

DRCOG fringe = NFR Urban
DRCOG urban = NFR Suburban
DRCOG suburban = NFR rural

Socioeconomic Data for North I25 Merged Model

DRCOG TAZ

ID	**2577**	**ID**	**2576**
AREA	151	AREA	15.917664
ID1	2605	ID1	2656
TAZ_ID	80203	TAZ_ID	80202
COUNTY_ID	123	COUNTY_ID	123
MODELAREA	1	MODELAREA	1
AT97	5	AT97	5
AT01	5	AT01	5
KFACTORDIS	2	KFACTORDIS	2
ZONE_ID	2577	ZONE_ID	2576
DISTRICT	Weld	DISTRICT	Weld
DIATIME	40	DIATIME	40
ZONE_TYPE	0	ZONE_TYPE	0
AREA_TYPE	5	AREA_TYPE	5
TAZ_ID_1	80203	TAZ_ID_1	80202
ACREAGE	96655	ACREAGE	10187
HH_POP	**5116**	**HH_POP**	**2387**
LOW_INC_HH	175	LOW_INC_HH	38
MED_INC_HH	1100	MED_INC_HH	475
HIGH_INC_H	436	HIGH_INC_H	267
PRODDIST_E	1019	PRODDIST_E	108
RETAIL_EMP	221	RETAIL_EMP	15
SERVICE_EM	310	SERVICE_EM	138
IE_P	0.000	IE_P	0
PKGCOST_LI	0.000	PKGCOST_LI	0.00
PKGCOST_MI	0.000	PKGCOST_MI	0.00
PKGCOST_HI	0.000	PKGCOST_HI	0.00
PKGCOST_SH	0.000	PKGCOST_SH	0.00
POP_DEN	0.050	POP_DEN	0.23
PCT_LOWINC	0.102	PCT_LOWINC	0.049
HNWAAO	1.598	HNWAAO	1.613
HNWAAOINV	0.626	HNWAAOINV	0.620
HNW_DA	0.600	HNW_DA	0.593
HNW_SR2	0.275	HNW_SR2	0.278
HNW_SR3	0.124	HNW_SR3	0.129
TOT_HH	**1711.000**	**TOT_HH**	**780**
AVG_HH_SIZ	2.990	AVG_HH_SIZ	3.06
ACCE_R_P	0.000	ACCE_R_P	0.00
EGRE_R_P	0.000	EGRE_R_P	0.00
ACCE_R_O	0.000	ACCE_R_O	0.00
EGRE_R_O	0.000	EGRE_R_O	0.00
ONE	1.000	ONE	1.00
DISTRICT_P	1.000	DISTRICT_P	1
DISTRICT_A	0.000	DISTRICT_A	0
TOT_EMP	**1550.000**	**TOT_EMP**	**261**
TOT_HH1	0.000	TOT_HH1	0.000
AVG_HH_SI1	0.000	AVG_HH_SI1	0.000
TOT_HH2	0.000	TOT_HH2	0.000
AVG_HH_SI2	0.000	AVG_HH_SI2	0.000
TOT_HH3	0.000	TOT_HH3	0.000
AVG_HH_SI3	0.000	AVG_HH_SI3	0.000
TOT_HH4	0.000	TOT_HH4	0.000
AVG_HH_SI4	0.000	AVG_HH_SI4	0.000
TOT_HH5	0.000	TOT_HH5	0.000
AVG_HH_SI5	0.000	AVG_HH_SI5	0.000

NFR TAZ

ID	**756**	**717**	**707**	**718**	**695**	
AREA	34.804	15.967	0.666	12.779	8.444	72.65
PERIMETER	160644.280000	105472.840	33050.531	0.000	67990.711	
ACRES	22274.321289	10218.701	426.000	8178.556	5404.016	
LOCATION_1	Weld	Weld	Platteville	Weld	Mead	
ZONE	756	717	707	718	695	
SZ1_HH	20	71	98	14	13	
SZ2_HH	47	118	144	64	38	
SZ3_HH	17	70	91	20	13	
SZ4_HH	20	73	99	28	23	
SZ5_HH	19	64	91	15	12	
H_20K	18	75	102	9	6	
HH_20K40K	25	99	134	22	15	
HH_40K60K	29	89	118	28	20	
HH_60K75K	18	56	74	22	15	
HH_75K	34	75	96	61	43	
TOT_HH	**123**	**396**	**523**	**141**	**99**	1282
R_EMP	1	5	38	0	148	
S_EMP	0	9	152	2	55	
PD_EMP	168	181	175	40	555	
O_EMP	0	0	0	0	0	
TOT_EMP	**169**	**195**	**365**	**42**	**758**	1529
IE_P	0	0	0	0	0	
AT	1	1	2	1	1	
UNIV	0	0	0	0	0	
JURIS_NO	4	4	4	4	4	
DENVER	0	0	0	0	0	
POPULATION	**351**	**1167**	**1564**	**398**	**287**	3767
POP_DENSIT	0.015758	0.114	3.671	0.049	0.053	
HH_DENSITY	0.005522	0.039	1.228	0.017	0.018	
EMP_DENSIT	0.007587	0.019	0.857	0.005	0.140	
R_DENSITY	0.000045	0.000	0.089	0.000	0.027	
S_DENSITY	0.000000	0.001	0.357	0.000	0.010	
PD_DENSITY	0.007542	0.018	0.411	0.005	0.103	
AREA_TYPE	Rural	Rural	Suburban	Rural	Rural	
DISTRICTS	8	8	8	8	8	
COUNTY	Weld	Weld	Weld	Weld	Weld	

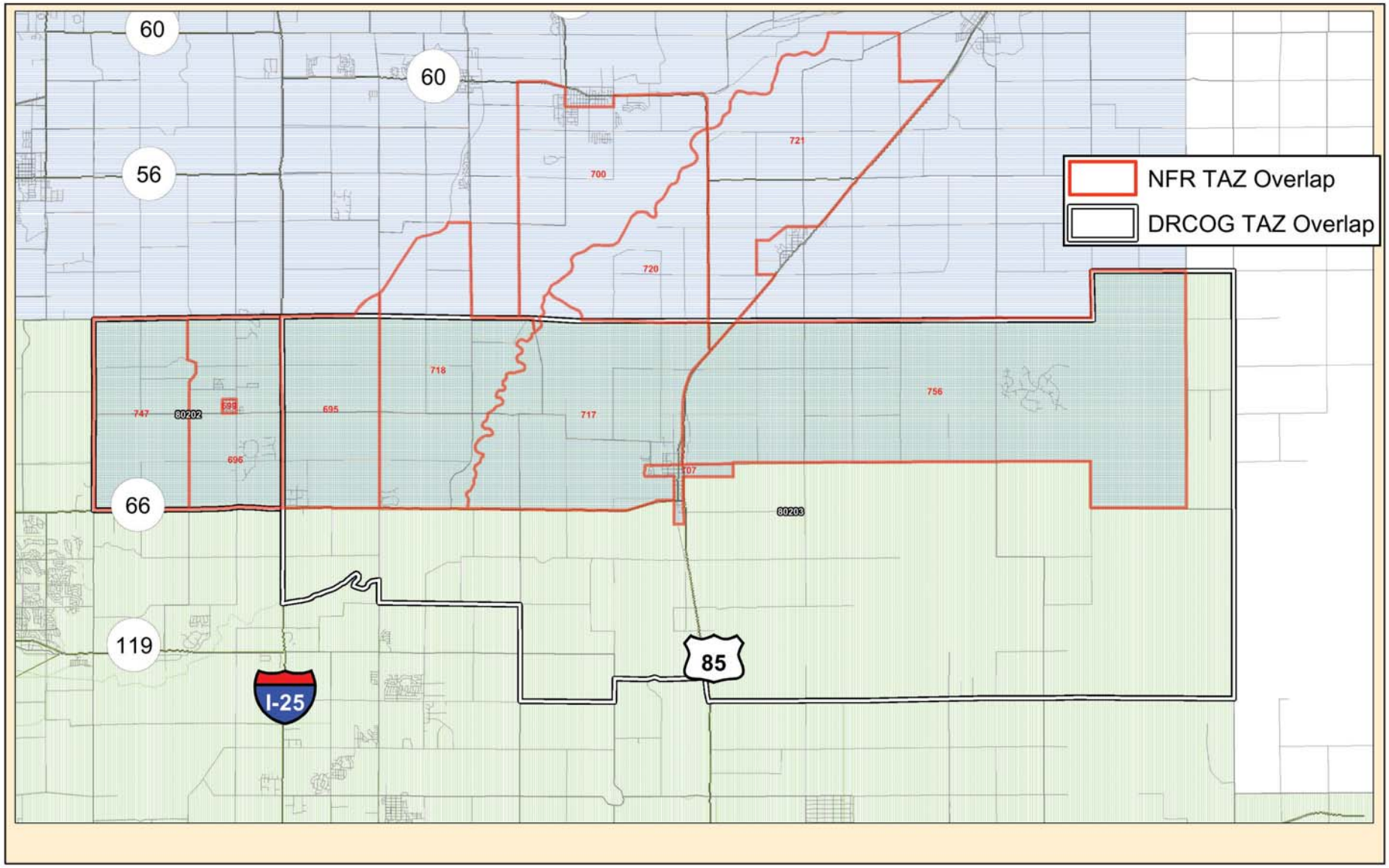
ID	**696.000**	**747.000**	**699.000**	
AREA	7.704	8.054	0.082	15.84
PERIMETER	70198.469	64310.133	6053.260	
ACRES	4930.375	5154.464	52.504	
LOCATION_1	Mead	Weld	Mead	
ZONE	696.000	747.000	699.000	
SZ1_HH	37.000	14.000	19.000	
SZ2_HH	188.000	49.000	36.000	
SZ3_HH	104.000	12.000	27.000	
SZ4_HH	135.000	21.000	20.000	
SZ5_HH	90.000	10.000	17.000	
H_20K	35.000	7.000	8.000	
HH_20K40K	77.000	16.000	15.000	
HH_40K60K	107.000	21.000	23.000	
HH_60K75K	79.000	16.000	16.000	
HH_75K	254.000	46.000	58.000	
TOT_HH	**554.000**	**106.000**	**119.000**	779
R_EMP	0.000	4.000	7.000	
S_EMP	3.000	11.000	14.000	
PD_EMP	133.000	23.000	31.000	
O_EMP	0.000	0.000	0.000	
TOT_EMP	**136.000**	**38.000**	**52.000**	226
IE_P	0.000	0.000	0.000	
AT	1.000	1.000	2.000	
UNIV	0.000	0.000	0.000	
JURIS_NO	4.000	4.000	4.000	
DENVER	0.000	0.000	0.000	
POPULATION	**1768.000**	**288.000**	**347.000**	2403
POP_DENSIT	0.359	0.056	6.609	
HH_DENSITY	0.112	0.021	2.266	
EMP_DENSIT	0.028	0.007	0.990	
R_DENSITY	0.000	0.001	0.133	
S_DENSITY	0.001	0.002	0.267	
PD_DENSITY	0.027	0.004	0.590	
AREA_TYPE	Rural	Rural	Suburban	
DISTRICTS	8.000	8.000	8.000	
COUNTY	Weld	Weld	Weld	

COMBINED TAZ

DRCOG_TAZ_	80203
ID	0
NEW AREA	**81.743**
DRCOG_ID	2677
DRCOG_AREA	151
DRCOG_ID1	2605
DRCOG_TAZ_	80203
DRCOG_COUN	123
DRCOG_MODE	1
DRCOG_AT97	5
DRCOG_AT01	5
DRCOG_DIAT	40
DRCOG_KFAC	2
NFR_ID_1	0
NFR_AREA_1	0
NFR_PERIME	0
NFR_ACRES	0
NFR_LOCATI	
NFR_ZONE	0
NFR_SZ1_HH	0
NFR_SZ2_HH	0
NFR_SZ3_HH	0
NFR_SZ4_HH	0
NFR_SZ5_HH	0
NFR_H_20K	0
NFR_HH_20K	0
NFR_HH_40K	0
NFR_HH_60K	0
NFR_HH_75K	0
NFR_TOT_HH	0
NFR_R_EMP	0
NFR_S_EMP	0
NFR_PD_EMP	0
NFR_O_EMP	0
NFR_TOT_EM	0
NFR_IE_P	0
NFR_AT	0
NFR_UNIV	0
NFR_JURIS_	0
NFR_DENVER	0
NFR_POPULA	0
NFR_POP_DE	0
NFR_HH_DEN	0
NFR_EMP_DE	0
NFR_R_DENS	0
NFR_S_DENS	0
NFR_PD_DEN	0
NFR_AREA_T	0
NFR_DISTRI	0
NFR_COUNTY	0

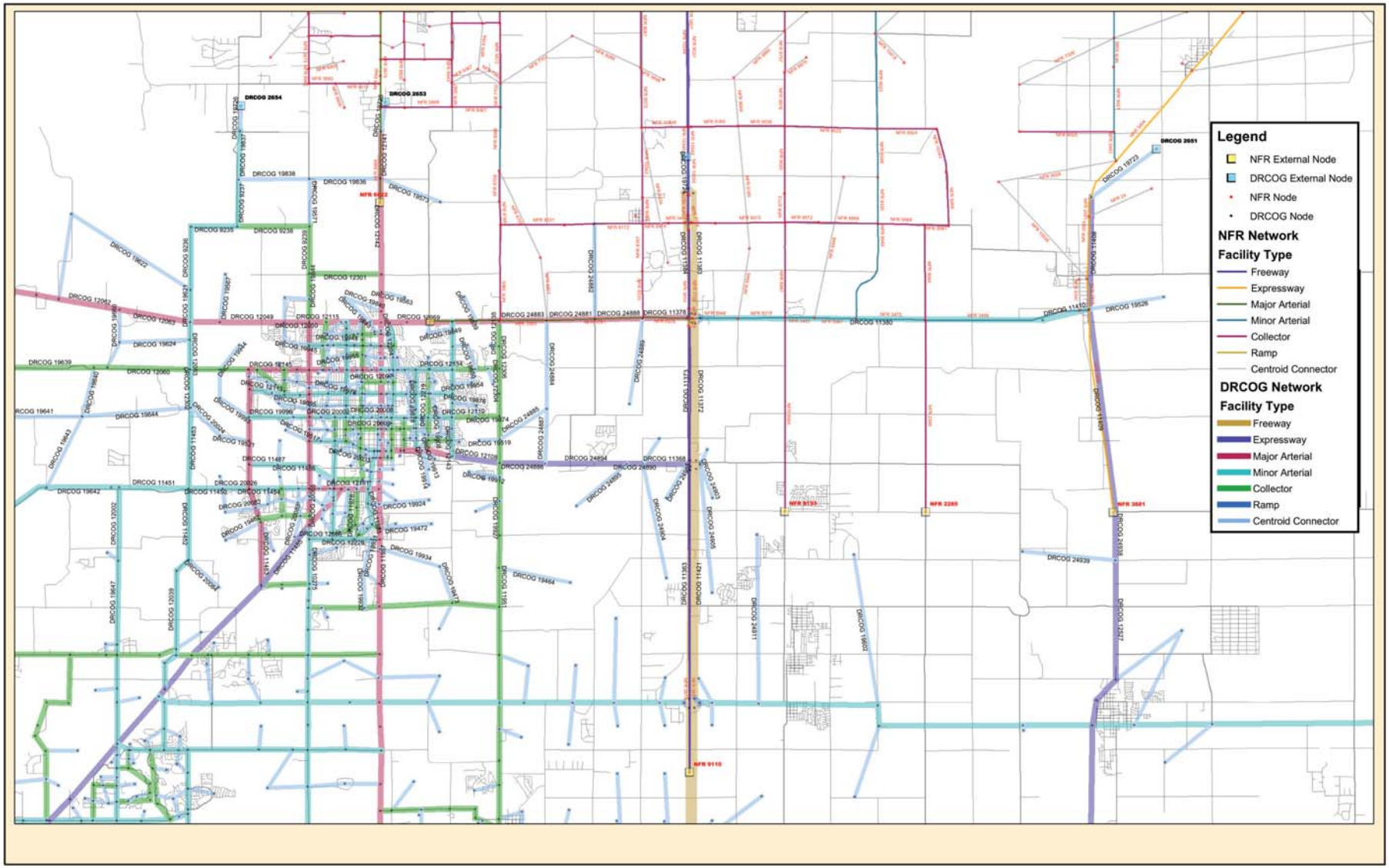
DRCOG and NFR TAZ Overlap Area

NORTH I-25 EIS
information. cooperation. transportation.



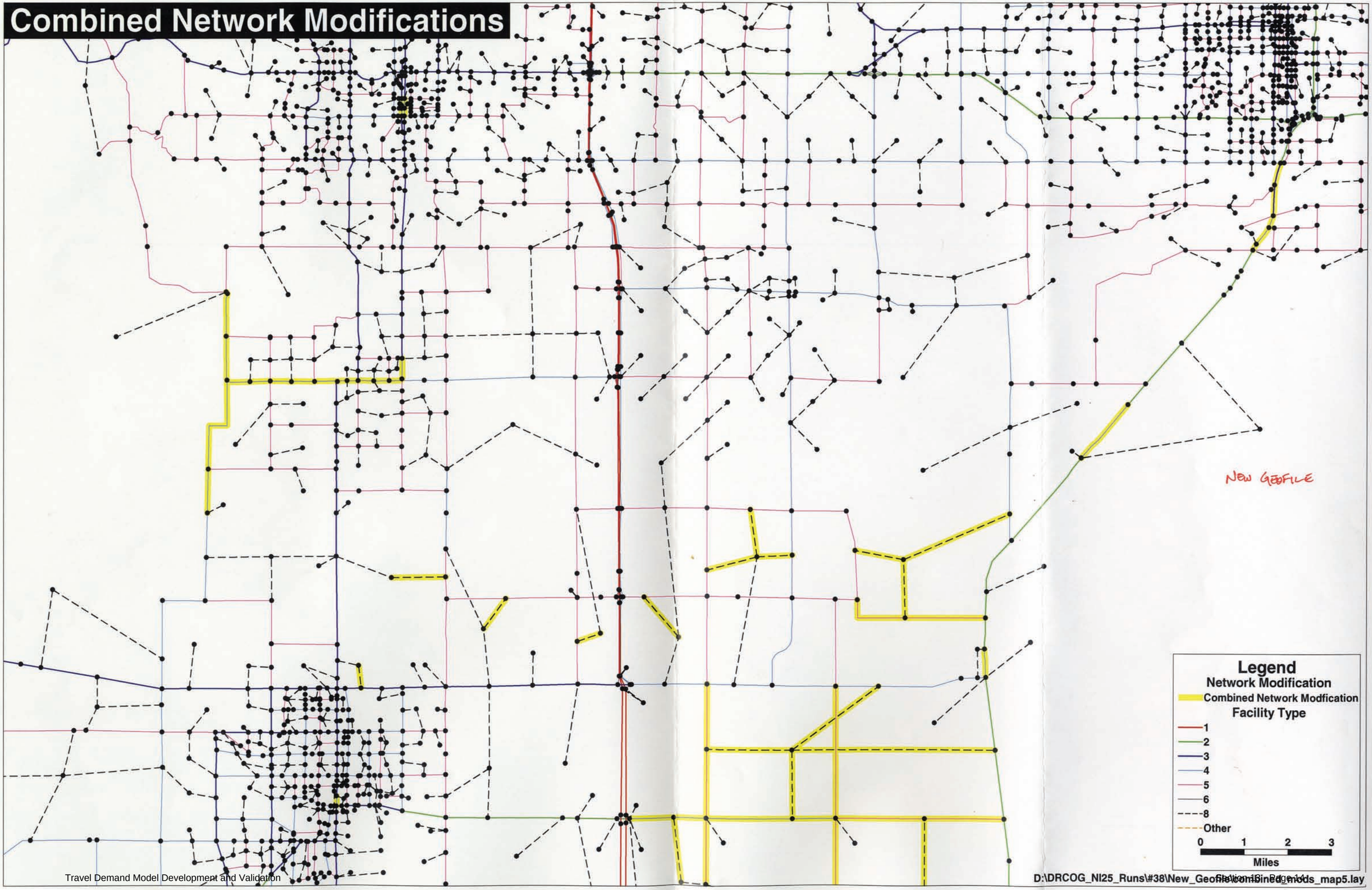
DRCOG and NFR Planning Model Network Merge

NORTH I-25 EIS
information. cooperation. transportation.



03-225 3/23/04

Combined Network Modifications



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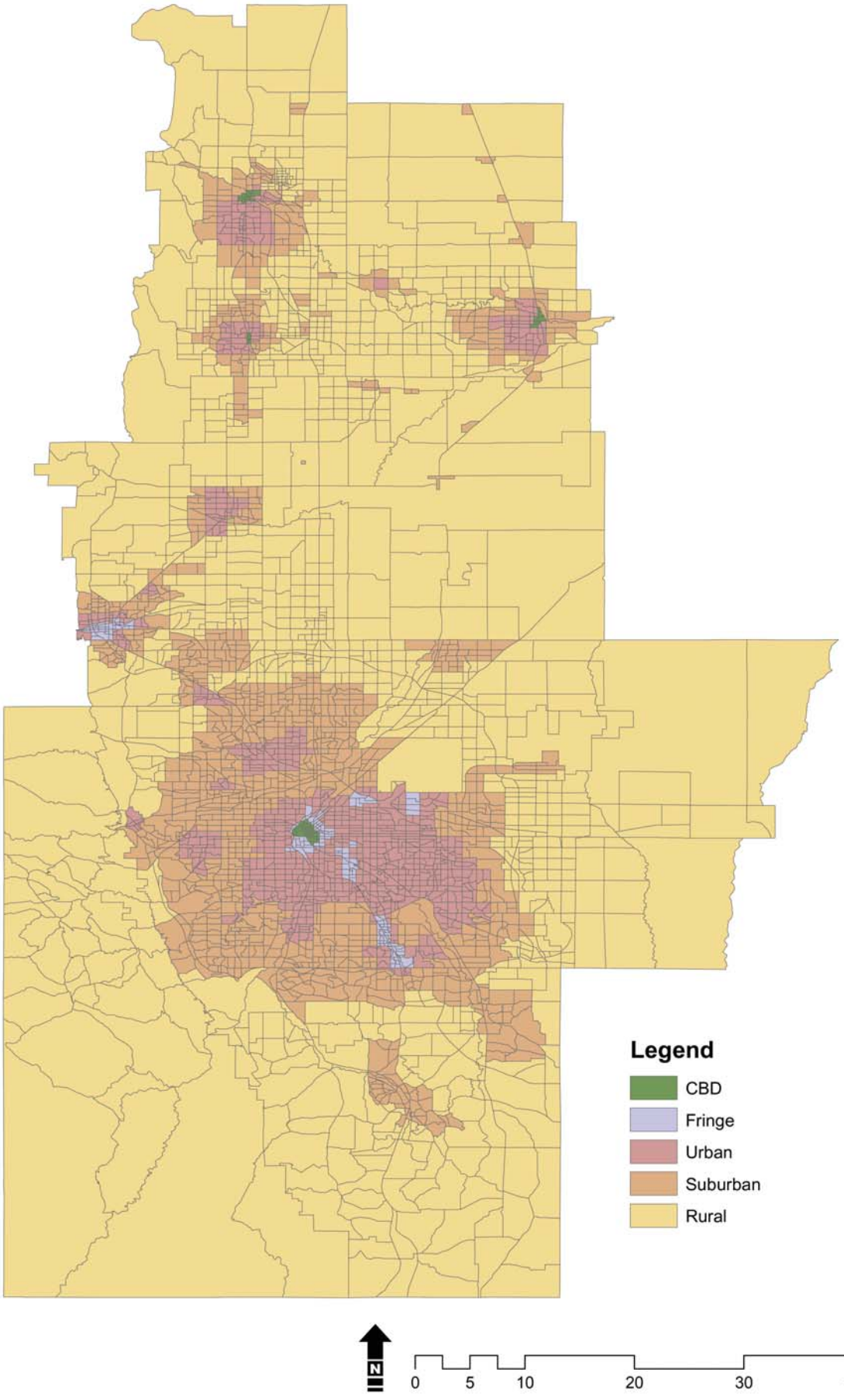
Combined Model 2001 Area Types

NORTH I-25 EIS



5/2/2006

Combined Network Coding Changes

Certain coding changes are made to the combined model network, which is merged from the NFRMPO network and the DRCOG network[1]. Some of the changes are in the vicinity of the border area to change the structure of the centroids and roads links from an "edge" zone in each respective model to network coding more appropriate for internal zones. Other changes are made to better reflect actual facility characteristics to improve the traffic assignment in the north front range area.

The coding changes are made to the base year 2000/2001 combined network, and the 2030 combined network.

The changes are listed below, and displayed on the accompanying graphic.

Link/Zone	From	To	Coding Action	Comment
Zone 93	--	--	Added Centroid Connector	Improve connection for non-edge internal zone
Zone 95	--	--	Added Centroid Connector	Improve connection for non-edge internal zone
Zone 3411	--	--	Added Centroid Connector	Improve connection for non-edge internal zone
Zone 3360	--	--	Added Centroid Connector	Improve connection for non-edge internal zone
Zone 3359	--	--	Added Centroid Connector	Improve connection for non-edge internal zone
Zone 2593	--	--	Added Centroid Connector	Improve connection for non-edge internal zone
Zone 3382	--	--	Added Centroid Connectors	Improve connection for non-edge internal zone

[1] See "Merging Networks.doc"

Link/Zone	From	To	Coding Action	Comment
Zone 3381	--	--	Added Centroid Connectors	Improve connection for non-edge internal zone
Zone 2620	--	--	Added Centroid Connector	Improve connection for non-edge internal zone
Zone 2577	--	--	Moved centroid from location east of US-85 at SH-66 to west of US-85 and south of SH-66	Replicate location within zone that represents majority of development activity
Zone 2577	--	--	Added Centroid Connectors	Improve connection for non-edge internal zone
Larimer CR-23	Boulder CR-2 (County Line)	Larimer CR-12	Upgraded from Collector to Minor Arterial	Roadway system continuity
SH-56	Larimer CR-23	US-287	Upgraded from Collector to Minor Arterial	Roadway system continuity
Weld CR-13	Weld CR-2	SH-66	Added Collector	Roadway system continuity
Weld CR-19	Weld CR-2	SH-66	Added Collector	Roadway system continuity
Weld CR-24	I-25	US-85	Added Collector	Roadway system continuity
Weld CR-34	Weld CR-19	US-85	Added Collector	Roadway system continuity
US-85	Fort Lupton vicinity		Downgraded from expressway to minor arterial	Reflect in-town characteristics
US-85	Platteville vicinity		Downgraded from expressway to minor arterial	Reflect in-town characteristics
US-85	Gilcrest vicinity		Downgraded from expressway to minor arterial	Reflect in-town characteristics

Link/Zone	From	To	Coding Action	Comment
US-85	La Salle vicinity		Downgraded from expressway to minor arterial	Reflect in-town characteristics
US-85	Evans vicinity		Downgraded from expressway to major arterial	Reflect in-town characteristics
US-85	Eaton vicinity		Downgraded from expressway to minor arterial	Reflect in-town characteristics
US-85	Ault vicinity		Downgraded from expressway to minor arterial	Reflect in-town characteristics
US-85	Pierce vicinity		Downgraded from expressway to minor arterial	Reflect in-town characteristics
US-287	Longmont from 3rd Avenue to 6th Avenue		Downgraded from major arterial to minor arterial	Reflect in-town characteristics
US-287	Berthoud from SH-56 to Bunyan Avenue		Downgraded from major arterial to minor arterial	Reflect in-town characteristics
US-287	Loveland from 1st Street to 7th Street		Downgraded from major arterial to minor arterial	Reflect in-town characteristics
US-287	Fort Collins from Mulberry Street to Jefferson Street		Downgraded from major arterial to minor arterial	Reflect in-town characteristics
US-287 (Old)	La Porte vicinity, between US-287 Bypass connections		Downgraded from major arterial to minor arterial	Reflect rural characteristics
SH-14	Summit View Drive to I-25		Upgrade from major arterial to expressway	Reflect facility characteristics
Riverside Avenue	Mulberry Street to Prospect Road		Downgraded from major arterial to minor arterial	Reflect facility characteristics

Link/Zone	From	To	Coding Action	Comment
Prospect Road	Riverside Avenue to I-25		Downgraded from major arterial to minor arterial	Reflect facility characteristics
Timberline Road	Drake Road to Prospect Road		Downgraded from major arterial to minor arterial	Reflect facility characteristics

J:_Transportation\071609.400\model\model development\Network Coding Changes.doc

MERGING OF INPUT FILES

Network

- Described in separate memorandum

Zone System

- Described in separate memorandum

Socio-economic data file

- NFR file:
- DRCOG file:
- Required fields for the DRCOG model needed to be "filled" for the NFR zones. NFR fields were mapped to the required fields of DRCOG using the following rules

Required DRCOG Socio-economic Attribute	**Mapping of NFR socio-economic attribute**
Acreage	Acres
HH_Pop	(SZ1_HH) + (2*SZ2_HH) + (3*SZ3_HH) + (4*SZ4_HH) + (5*SZ5_HH)[1]
Low_Inc_HH	IncLow*TotHH[2]
Med_Inc_HH	IncMed*TotHH
High_Inc_HH	IncHigh*TotHH
ProdDist_E	PD_Emp + O_Emp
Retail_Emp	R_Emp
Service_Emp	S_Emp

TAZ file

- NFR file:
- DRCOG file:

[1] NFR household population is not a direct data field, so it is derived from household size.
[2] INCLOW is derived from ….

- Required fields for the DRCOG model needed to be "filled" for the NFR zones. NFR fields were mapped to the required fields of DRCOG using the following rules

Required DRCOG TAZ Attribute	Mapping of NFR TAZ attribute
District	"NFR"
DIA Time	99

Parking Costs

- DRCOG file: ParkingInputs.bin
- Required fields for the DRCOG model needed to be "filled" for the NFR zones. NFR fields were mapped to the required fields of DRCOG using the following rules

Required DRCOG Attribute	Mapping of NFR attribute
Acres	Acres

Market Segmentation

- DRCOG file: Market_Seg.mtx
- Required fields for the DRCOG model needed to be "filled" for the NFR zones. NFR fields were mapped to the required fields of DRCOG using the following rules

Required DRCOG Attribute	Mapping of NFR attribute
CBD Market Segment	1 from all zones to CBD zones
DIA Market Segment	1 from all zones to DIA zones
Non-CBD Market Segment	0 from all zones to zones

Market Segmentation

- DRCOG file: Market_Seg.mtx
- Required fields for the DRCOG model needed to be "filled" for the NFR zones. NFR fields were mapped to the required fields of DRCOG using the following rules

Required DRCOG Attribute	Mapping of NFR attribute
CBD Market Segment	1 from all zones to CBD zones

DIA Market Segment	1 from all zones to DIA zones
Non-CBD Market Segment	0 from all zones to zones

Area Type

- DRCOG file: smooth05.bin
- Required fields for this input file to the DRCOG area type model needed to produced for the NFR zones. For each zone, this file contains the percentage of each zone within 0.5 miles of the target zone's centroid. This was performed in GIS for the NFR zones, and the resulting data added to the smooth05.bin file.

J:_Transportation\071609.400\model\Input File Merging.doc

COPY GEOGRAPHIC FILES

ADD NEW ID FIELDS TO MAINTAIN RELATIONSHIP WITH ORIGINAL FILES

Links

DRCOG_ID

NFR_ID

Nodes

DRCOG_ID

NFR_ID

Calculate each new field

=ID

ADD ALL NFR FIELDS TO DRCOG LINK AND NODE TABLES

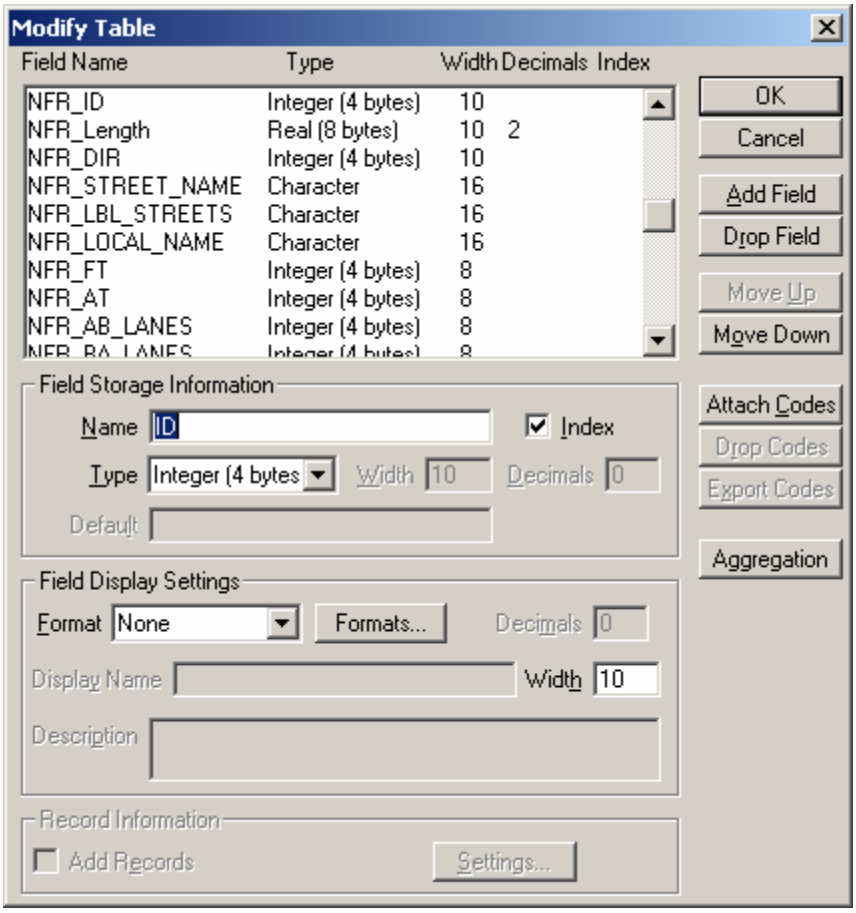
MERGE NFR INTO DRCOG

Merging Transitbase files for NFRMPO and DRCOG Combined Model

This memorandum describes the methodology used to merge the transitbase file from the DRCOG model to the NFRMPO network to create a combined transitbase for use in the North I-25 EIS Travel Demand Forecasting.

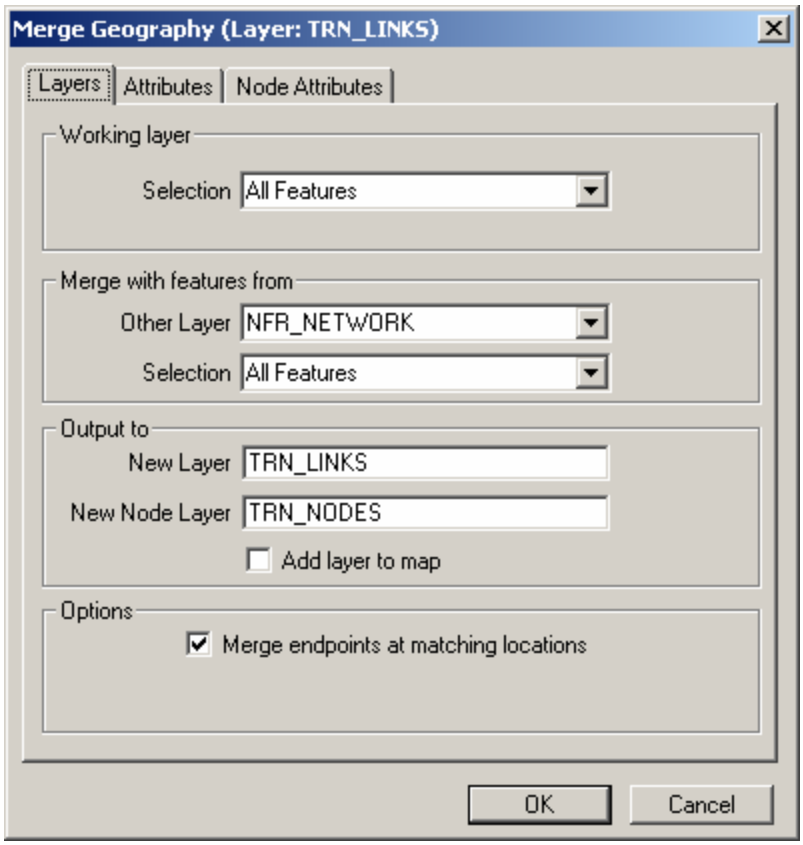
Merge Geographic Files

Open the DRCOG transitbase.dbd file and NFRMPO network file for exclusive use. Add all NFR fields to the DRCOG dataview using the Dataview→Modify Table command. Add "NFR_" to the beginning of each new field to indicate it's relationship to the NFR system.

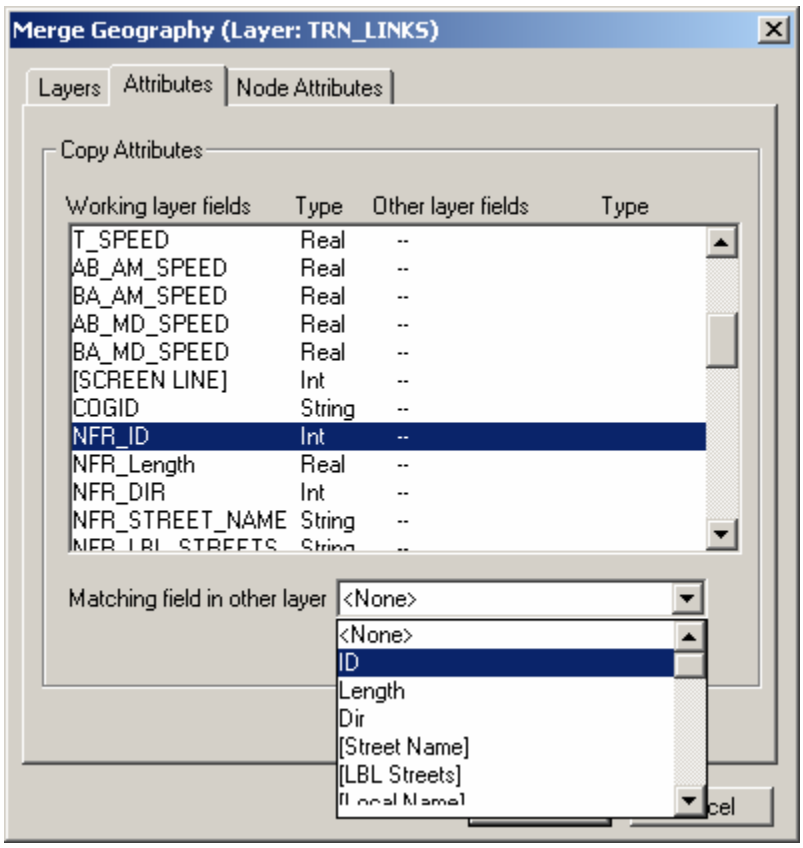


Repeat this process in the Nodes dataview. Also, add a new field titled "NI25_ID" to the nodes dataview.

While the DRCOG map is active and the links are selected in the layer pull-down menu, go to Tools→Geographic Utilities→Merge Geography. Ensure that "Merge endpoints at matching locations" is checked.



In the Attributes tab, select the correlating NFR field for the new fields in the DRCOG links layer, as shown below. Do the same for the nodes layer in the Node Attributes tab. This will fill these fields for the new links.



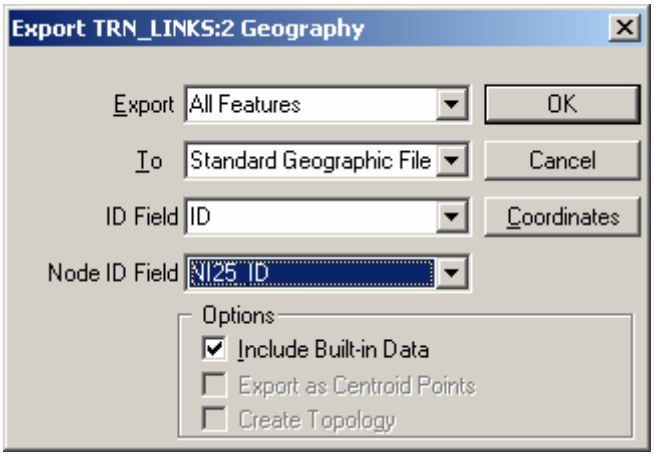
Click OK and name the new merged .dbd file.

Exporting with NI25_ID's

Now, it is necessary to reassign the correct ID's to the Nodes in the new .dbd. Open the new .dbd for exclusive use. Select nodes with "NFR_Zone"=null. Fill NI25_ID with ID. Then, select nodes with "NFR_Zone">1 and fill NI25_ID with "NFR_Zone + 2664". This will fill NFR centroids with NI25_ID's from 2665 – 3479.

Make the links layer active and go to Tools→Export. Export: All Features, To: Standard Geographic File, ID Field: ID, Node ID Field: NI25_ID.

This will create the merged transitbase with correct ID's for all centroids.



Editing the Merged File

Finally, the following edits should be made to the merged dataview files.

Edits to Link Attributes:

1. "Dist" – Selected all links with "Dist = null". Filled with values from Length".
2. "Type" – Selected all links with "Type = null". Filled all cells with "1". Note: The 2030 DRCOG hwy dbd file no longer includes transit links (except for one random link near downtown), those are only in the TransitBase.dbd file.
3. "Facility Type" – Selected all links with "[Facility Type] = null". Filled with values from NFR_FT. Select all Facility Type=7 and change to 4.
4. "LaneAB" & "LaneBA" – Selected all links with "LaneAB = null". Filled with values from NFR_AB_Lane. Repeated for LaneBA.
5. "Lane" – Selected all links with "Lane = null". Filled with values from LaneAB. Sort by Lane. Make sure there are no values of "0". If there are, change them to null, "--". Again, select all links with "Lane = null". Fill with values from LaneAB. As a check, unselect all links, sort by Lane, and check to make sure all cells are filled and seem appropriate.
6. "Toll" – Fill all null values for each field with "0".

Edits to Node Attributes:

1. "ZONE" – Add a field called ZONE to go with NFRZONE. Fill ZONE with "NFRZONE + 2664". NFR ZONE should have records 1-815 while ZONE has records 2665-3479.

2. "LOGIT" – Add field LOGIT as Integer (4 bytes). Also add a NFR_LOGIT field to indicate that the LOGIT field is from the NFR model.
3. "Parking" – Add "1" where appropriate for park-n-Rides. In 2001 model, p-n-R's were located at US34&I-25 and Mulberry&I-25. Remember, data for this field must be entered in the TransitBase.dbd and is actually not necessary in the highway dbd file.

Furthermore, refer to

"Merging NFRMPO and DRCOG Networks"
(R:_transportation\071609\Model Development\model\model development\Merging Zones.doc)

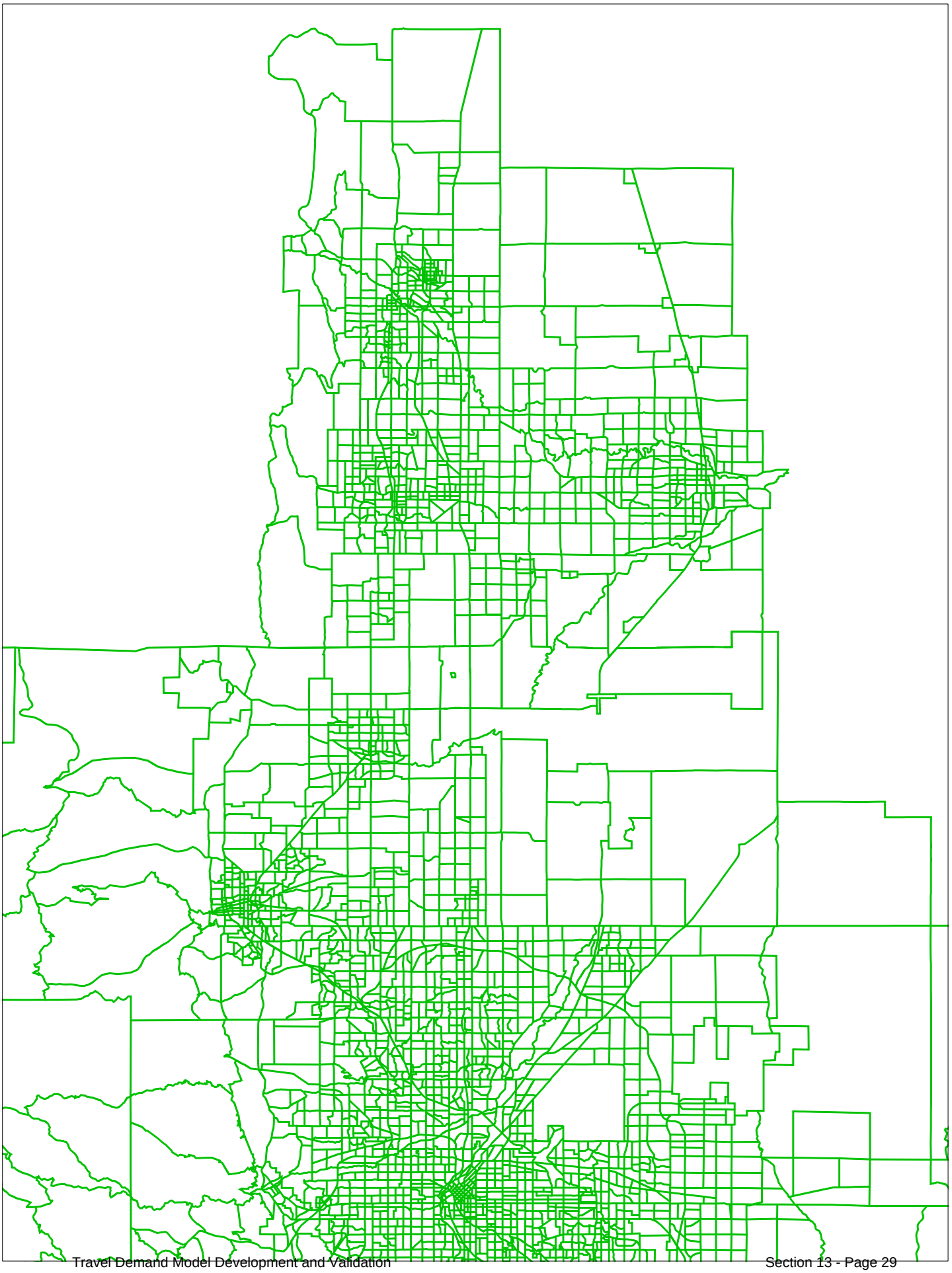
And,

"Merging NFRMPO and DRCOG Zone Systems"
(R:_transportation\071609\Model Development\model\model development\Merging Networks.doc)

These files outline changes made to the areas that overlap the two separate networks.

R:_transportation\071609\Model Development\model\model development\Merging Transitbase Methodology.doc

North I-25 Model Zone System



UPDATING ATTRIBUTES OF MERGED NFRMPO AND DRCOG 2030 NETWORKS

Edits to Link Attributes:

1. "Dist" – Selected all links with "Dist = null". Filled with values from Length".
2. "Type" – Selected all links with "Type = null". Filled all cells with "1".
   Note: The 2030 DRCOG hwy dbd file no longer includes transit links (except for one random link near downtown), those are only in the TransitBase.dbd file.
3. "Facility Type" – Selected all links with "(Facility Type) = null". Filled with values from NFR_FT. Select all Facility Type=7 and change to 4.
4. "LaneAB" & "LaneBA" – Selected all links with "LaneAB = null". Filled with values from NFR_AB_Lane. Repeated for LaneBA.
5. "Lane" – Selected all links with "Lane = null". Filled with values from LaneAB. Sort by Lane. Make sure there are no values of "0". If there are, change them to null, "--". Again, select all links with "Lane = null". Fill with values from LaneAB. As a check, unselect all links, sort by Lane, and check to make sure all cells are filled and seem appropriate.
6. "Toll", "TollCost", "TollCost_HOV", and "Cost" – Fill all null values for each field with "0".

Edits to Node Attributes:

1. "ZONE" – Add a field called ZONE to go with NFRZONE. Fill ZONE with "NFRZONE + 2664". NFR ZONE should have records 1-815 while ZONE has records 2665-3479.
2. "LOGIT" – Add field LOGIT as Integer (4 bytes). Also add a NFR_LOGIT field to indicate that the LOGIT field is from the NFR model.
3. "Parking" – Add "1" where appropriate for park-n-Rides. In 2001 model, p-n-R's were located at US34&I-25 and Mulberry&I-25. Remember, data for this field must be entered in the TransitBase.dbd and is actually not necessary in the highway dbd file.

J:_Transportation\071609.400\model\model development\Merging Networks_2030 Attributes.doc

2004 Ridership for the BUS

	JAN	FEB	MAR	**1st QTR**	APR	MAY	JUN	**2nd QTR**
RIDERSHIP	37,748	42,192	39,972	119,912	38,840	22,883	22,142	83,865
ACCUM RIDERSHIP	37,748	79,940	119,912		158,752	181,635	203,777	

AVERAGE DAILY RIDERSHIP

MONDAY	1,605	2,341	1,842	1,929	1,930	1,092	899	1,307
TUESDAY	1,675	1,878	1,587	1,713	1,552	1,084	947	1,195
WEDNESDAY	2,020	2,180	1,772	1,990	1,846	994	904	1,248
THURSDAY	1,629	1,700	1,428	1,586	1,458	1,010	980	1,149
FRIDAY	1,575	1,977	1,612	1,721	1,705	1,008	916	1,210
SATURDAY	432	473	453	452	429	427	427	427
M - F	1,695	2,015	1,659	1,790	1,688	1,037	929	1,218
M - S	1,452	1,758	1,480	1,563	1,494	915	852	1,087

2001 Transfort Fixed Route Rides

Daily Average Rides

DAY SERVICE

Route	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
1	879	953	915	875	805	878	814	825	841	891	809	805	858
2	554	641	467	489	346	288	303	467	642	631	533	330	474
3	791	739	616	552	484	ns	ns	761	769	772	758	653	690
4	389	449	386	397	320	303	301	345	400	422	404	338	371
5	221	224	244	220	230	223	234	224	220	218	232	231	227
6	432	479	404	404	366	319	278	355	429	444	423	348	390
7	438	586	471	506	319	216	213	402	630	649	551	361	445
8	316	321	332	316	315	295	284	296	311	320	302	283	308
9	411	413	371	383	392	307	265	307	395	415	394	350	367
10	199	217	177	201	183	146	146	175	222	209	178	134	182
11	1451	1352	1089	973	770	ns	ns	1022	1106	1156	1201	1041	1116
Southside Shuttle	108	115	102	110	111	88	76	80	94	90	86	67	94
FoxTrot	265	283	274	256	263	319	326	304	308	309	295	276	290
14	177	203	210	191	175	177	199	218	197	225	230	225	202
Subtotal													6013

EVENING SERVICE

Route	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
3/4 (Sun-Sat)	99	113	107	104	96	ns	ns	82	99	115	125	113	105
6/7 (Sun-Thur)	42	49	46	44	40	ns	ns	47	48	51	59	54	48
NightLITe (Fri-Sat)	67	77	84	77	95	ns	ns	72	77	81	85	89	80
Subtotal													234
TOTAL													6247

TRANSFORT Daily Ridership

2003			
Day Service	**# of Days**	**Total Ridership**	**Daily Average**
Routes 1-15	306	1,366,467	4,466
*FoxTrot	306	102,648	335
Total Day Service	306	1,469,115	4,801
Night Service			
** Total Night Service	206	27,214	132

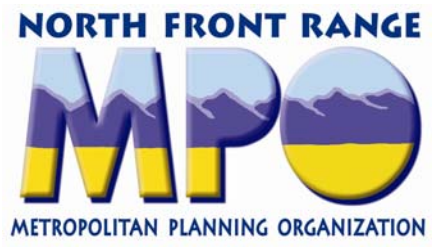
2004 YTD January thru August			
Day Service	**# of Days**	**Total Ridership**	**Daily Average**
Routes 1-15	207	805,695	3,892
*FoxTrot	207	75,445	364
Total Day Service	207	881,140	4,257
Night Service			
** Total Night Service	117	6,496	56

* FoxTrot is a regional connector route between Fort Collins and Loveland.

** Night service operates during CSU sessions only. In 2003, there were three night routes; in 2004 only one night route.

REGIONAL TRANSIT ELEMENT

Prepared for:



Prepared by:

and

April, 2004

Population Served

Several years ago the City of Fort Collins made a strategic decision to focus its transit resources on serving the portion of the city with the densest development and the student market. This has resulted in a system that served a constrained service area with good productivity. The system carries an average of 26 passengers per hour with the routes serving the university carrying the highest numbers of passengers.

Table 8 illustrates the 2003 ridership by route for the system. As shown, Route 1 carries the largest number of passengers annually. It connects the CSU Transit Center to the Foothills Fashion Mall and the South Transit Center via College Avenue. Route 63 carries the fewest passengers annually with fewer than 4,000 passenger trips in 2003.

Table 8. 2003 Transfort Route Information

Route	Annual Passengers	Annual Service Hours	Passengers per Hour
1	238,657	13,730	17.4
2	156,435	4,110	38.1
3	118,368	1,798	65.8
4	67,415	3,794	17.8
5	83,771	3,932	21.3
6	123,636	4,042	30.6
7	103,474	5,221	19.8
8	104,051	3,810	27.3
9	48,197	3,482	13.8
91&92	11,236	158	70.9
11	179,012	2,199	81.4
14	42,247	3,831	11.0
15	89,968	3,871	23.2
61	16,755	1,330	12.6
62	6,501	792	8.2
63	3,958	463	8.5
FoxTrot	102,648	3,917	26.2
Special	8,354	166	50.4

In addition to serving Fort Collins residents, Transfort is the operator of FoxTrot, the regional route connecting Fort Collins and Loveland. This route is funded by Fort Collins, Loveland, and Larimer County and is listed above. Transfort also operates a Dial-A-Ride service to Laporte and Wellington under contract to Larimer County. Likewise, these services are included in the description of demand response services that are operated by the City of Fort Collins.

In 2001 the City of Fort Collins prepared a Strategic Plan to guide its future development. This plan has been adopted by the City Council and the first phase implemented. The plan gradually moves the system towards a grid system, extending service to many areas of town that now have little or no service. The plan extends service to the I-25 corridor and responds to planned development. In general, transit service is provided on a ½- to 1-mile grid, with closer spacing in the densely developed downtown area. Service improvements are focused on increased frequencies, a strategy that will make the service more attractive to a broad range of people.

Operating Statistics

Table 9 illustrates the operating statistics for TransFort's fixed-route system.

Table 9. Transfort Fixed-Route Operating Statistics - 1999-2003

	1999	2000	2001	2002	2003
Ridership	1,431,779	1,545,672	1,616,328	1,471,911	1,504,683
Annual Vehicle Miles	739,707	801,125	793,358	705,885	729,638
Annual Vehicle Hours	54,963	60,000	59,747	56,616	60,648
Annual Operating Cost	1,071,574	3,015,812	3,400,134	3,529,564	3,689,620
Annual Fares	684,570	722,330	711,000	715,528	708,333
Source: Transfort					

Table 10 illustrates the operating statistics for TransFort's DAR system.

Table 10. Transfort Dial A Ride Operating Statistics - 1999-2003

	1999	2000	2001	2002	2003
Ridership	65,166	73,853	74,884	76,835	73,678
Annual Vehicle Miles	332,345	363,623	385,497	430,345	419,228
Annual Vehicle Hours	27,320	32,149	34,843	35,785	31,690
Annual Operating Cost	1,071,574	1,381,902	1,510,446	1,719,764	1,686,237
Annual Fares	135,093	144,411	132,619	105,770	101,623
Source: Transfort					

City of Loveland Transit – COLT

COLT operates two fixed-route services and provides funding for the regional FoxTrot route connecting Loveland and Fort Collins. In addition COLT operates a demand-response service for elderly and disabled residents of Loveland called the Minibus. Figure __ illustrates the existing COLT fixed-route bus service. In addition, paratransit service is provided throughout the city. The City is presently evaluating how best to provide transit services and what routes may best serve the community.

COLT's local routes begin service at 6:38 a.m. and continue until 6:38 p.m., Monday through Saturday. The regular fares are $1.00 for a one-way ride. People who are elderly, have disabilities, and the youth pay $.50 per ride. Special rates are also available for low income residents. Passes and tickets are available.

Only seniors and ADA are eligible for the paratransit service. Paratransit fares are $2.00 for a single ride. A 20-ride pass is available for $35.

Population Served

The fixed-route system connects the residential areas of the city to major activity centers in the downtown area and along Eisenhower Blvd to Interstate 25. Highway 287 goes through the heart of Loveland, connecting the city to Fort Collins on the north to Longmont on the south end. The FoxTrot, a regional route funded by Loveland, Fort Collins and Larimer County, provides service on this important connection.

An on-board survey conducted in January of 2004 indicated that individuals who are unable to drive – because they do not have a driver's license or cannot afford a car make up the majority of the ridership. Thirty-four per cent report incomes of less than $15,000 annually and 50% have incomes of less than $25,000 annually. Sixty-five per cent of COLT riders do not have a driver's license and 83% do not have a vehicle available to drive.

Ridership in 2003 is illustrated for the two main routes in Loveland in Table 11. The FoxTrot, connecting Loveland and Fort Collins is described as part of the Transfort system.

Table 11. COLT 2003 Ridership by Route

Route	Riders (est.)	Service Hours	Riders / Hour
Jitterbus	35,437	3,684	9.6
Tango	18,000	3,684	4.9
System-wide	53,437	7,368	7.3

The city is growing towards the I-25 corridor and major activity centers are already located at Interstate 25. Over time, service between the older portions of Loveland and the interstate will grow in importance.

Operating statistics

Tables 12 and 13 illustrate the operating statistics for Loveland's fixed-route and Mini Bus systems.

Table 12. COLT Fixed-Route Operating Statistics - 1999-2003

	2001	2002	2003
Ridership	78,207	70,511	53,437
Annual Vehicle Miles			7,368
Annual Vehicle Hours			115,432
Annual Operating Cost			$303,782
Annual Fares			
Source: COLT and Loveland COLT Transit Plan, Tech Memo #1, LSC.			

Table 13. COLT Mini-bus Operating Statistics - 1999-2003

	2001	2002	2003
Ridership			14,911
Annual Vehicle Miles			55,260
Annual Vehicle Hours			11,052
Annual Operating Cost			$379,079
Annual Fares			

Performance Measures

Table 14 provides information on COLT performance measures. These are used to determine how well resources are being use and whether the services are cost-effective.

students traveling within the university. The UNC route has significantly higher ridership than other local routes. Each of these routes serves an important purpose, connecting the residents, particularly in the areas of town with the most transit dependent population with the activity centers. In the last decade, Greeley has seen important activity centers develop on the north and west ends of town.

Table 15. The Bus Ridership by Route

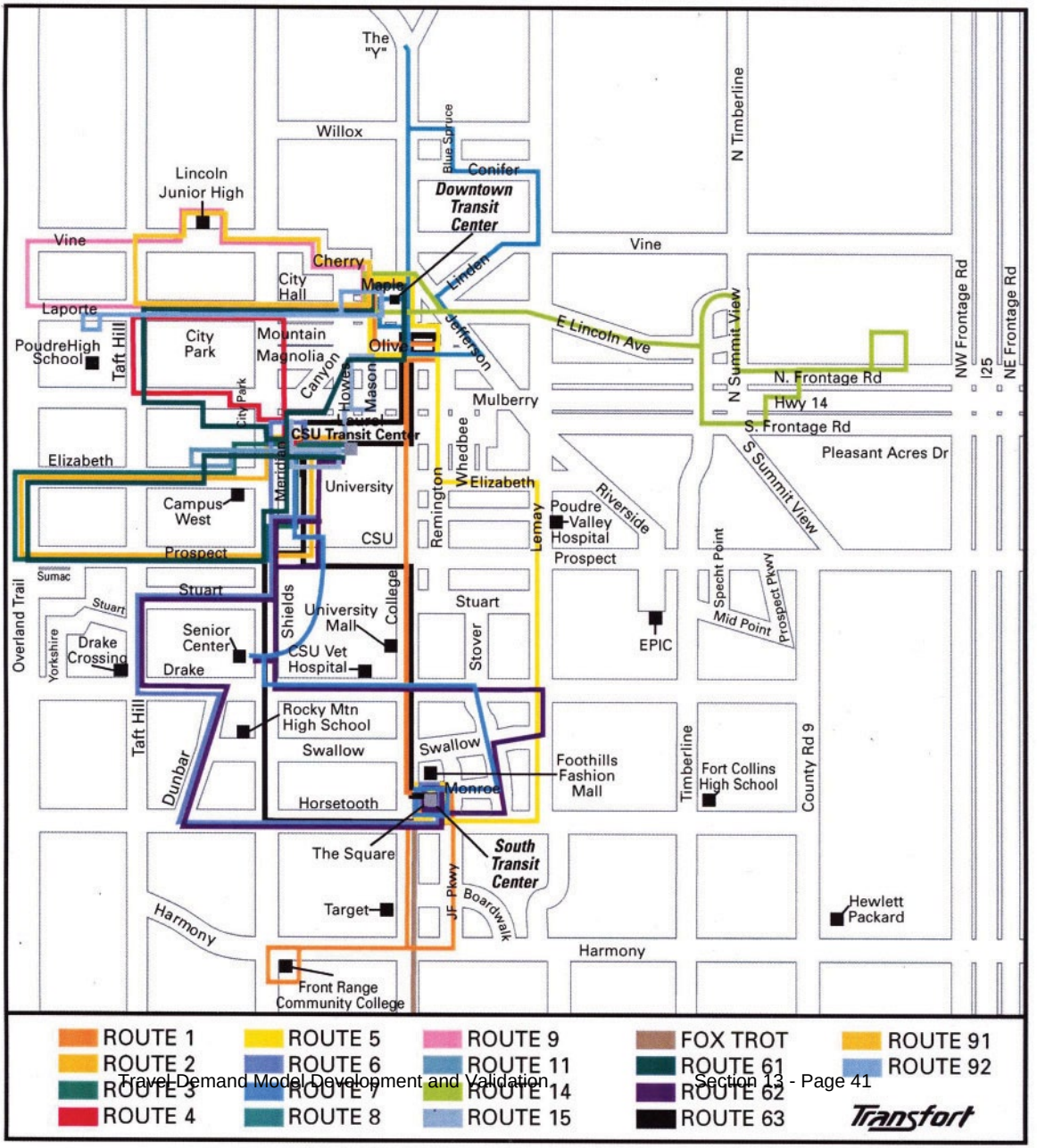
Route	Annual Passengers	Annual Service Hours	Passengers per Hour
1/2	35,104	3,456	10.2
2/1	34,883	3,380	10.3
3/4	27,471	3,456	7.9
4/3	26,268	3.456	7.6
5	107,256	6,785	15.8
6	27,615	3,507	7.9
UNC	147,677	2,847	51.9

Operating statistics

Table 16 illustrates the operating statistics for Greeley's fixed-route system.

Table 16. The Bus Fixed-Route Operating Statistics - 1999-2003

	1999	2000	2001	2002	2003
Ridership	297,844	393,769	471,921	398,841	410,274
Annual Vehicle Miles	385,302	389,469	386,213	355,472	355,268
Annual Vehicle Hours	27,820	29,199	29,621	27,305	27,090
Annual Operating Cost	$1,240,969	$1,286,451	$1,443,379	$1,468,346	$1,443,943
Annual Fares	$199,913	$186,004	$200,181	$216,416	$228,244
Source: The Bus					


The "Y"
Willox
Blue Spruce
Conifer
Downtown Transit Center
N Timberline
Lincoln Junior High
Vine
Cherry
City Hall
Maple
Linden
Laporte
PoudreHigh School
Taft Hill
City Park
Mountain Magnolia
Oliva
Jefferson
E Lincoln Ave
N Summit View
NW Frontage Rd
I25
NE Frontage Rd
N. Frontage Rd
Hwy 14
S. Frontage Rd
Pleasant Acres Dr
S Summit View
Canyon
Howes
Mason
Laurel
Mulberry
CSU Transit Center
Elizabeth
Meridian
University
Whedbee
Remington
Lemay
Riverside
Poudre Valley Hospital
Campus West
CSU
Prospect
Sumac
Stuart
Overland Trail
Yorkshire
Drake Crossing
Drake
Shields
University Mall
College
Senior Center
CSU Vet Hospital
Stover
EPIC
Specht Point
Prospect Pkwy
Mid Point
Taft Hill
Rocky Mtn High School
Swallow
Dunbar
Horsetooth
Foothills Fashion Mall
Timberline
Fort Collins High School
County Rd 9
Monroe
The Square
South Transit Center
JF Pkwy
Boardwalk
Target
Harmony
Hewlett Packard
Front Range Community College
N
ROUTE 1
ROUTE 2
ROUTE 3
ROUTE 4
ROUTE 5
ROUTE 6
ROUTE 7
ROUTE 8
ROUTE 9
ROUTE 11
ROUTE 14
ROUTE 15
FOX TROT
ROUTE 61
ROUTE 62
ROUTE 63
ROUTE 91
ROUTE 92
Transfort

The Bus-Map of all Routes - Microsoft Internet Explorer

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Back Search Favorites

Address http://www.ci.greeley.co.us/cog/PageX.asp?fkOrgId=21&PageURL=AllRoutes

Google greeley bus map Search PageRank 10 blocked Check Look for Map AutoFill Option

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THE BUS

SERVICES
- Fixed Routes
- Paratransit
- Demand Response
- Special Event Shuttles
- UNC Boomerang Shuttle
- VanGo
- Bike Racks
- Alternative Transportation

FAQ's

HELPFUL LINKS

CALENDAR OF EVENTS

CONTACT US

NEWS
- Summer Youth Fare
- Sunday Service starts at theBUS
- Safety and Security~ Transit Watch Program
- Adopt a Bus Stop
- Citizen Transportation Advisory Board

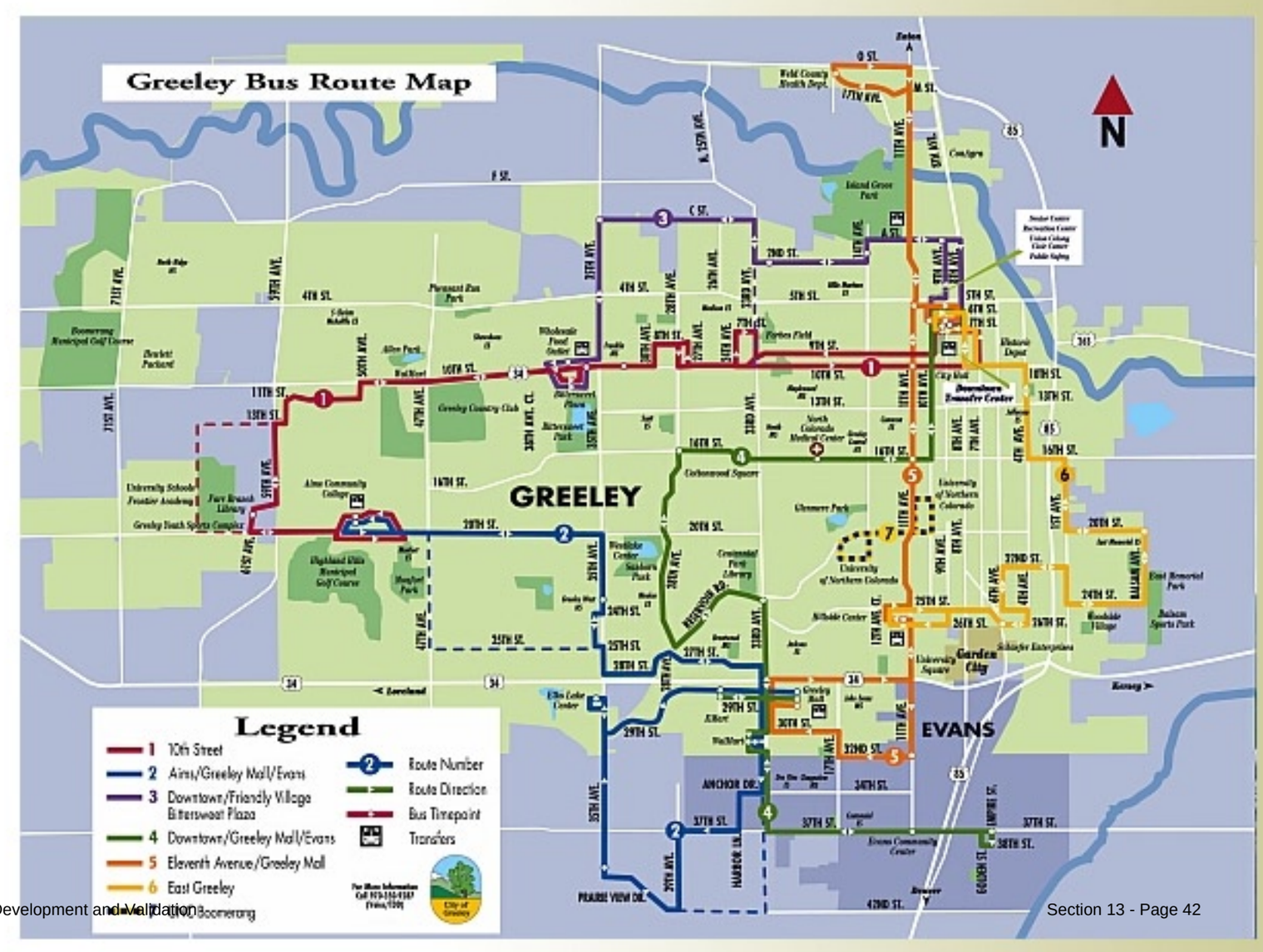
ARCHIVED NEWS
- TheBus Extends Service to 65th Avenue

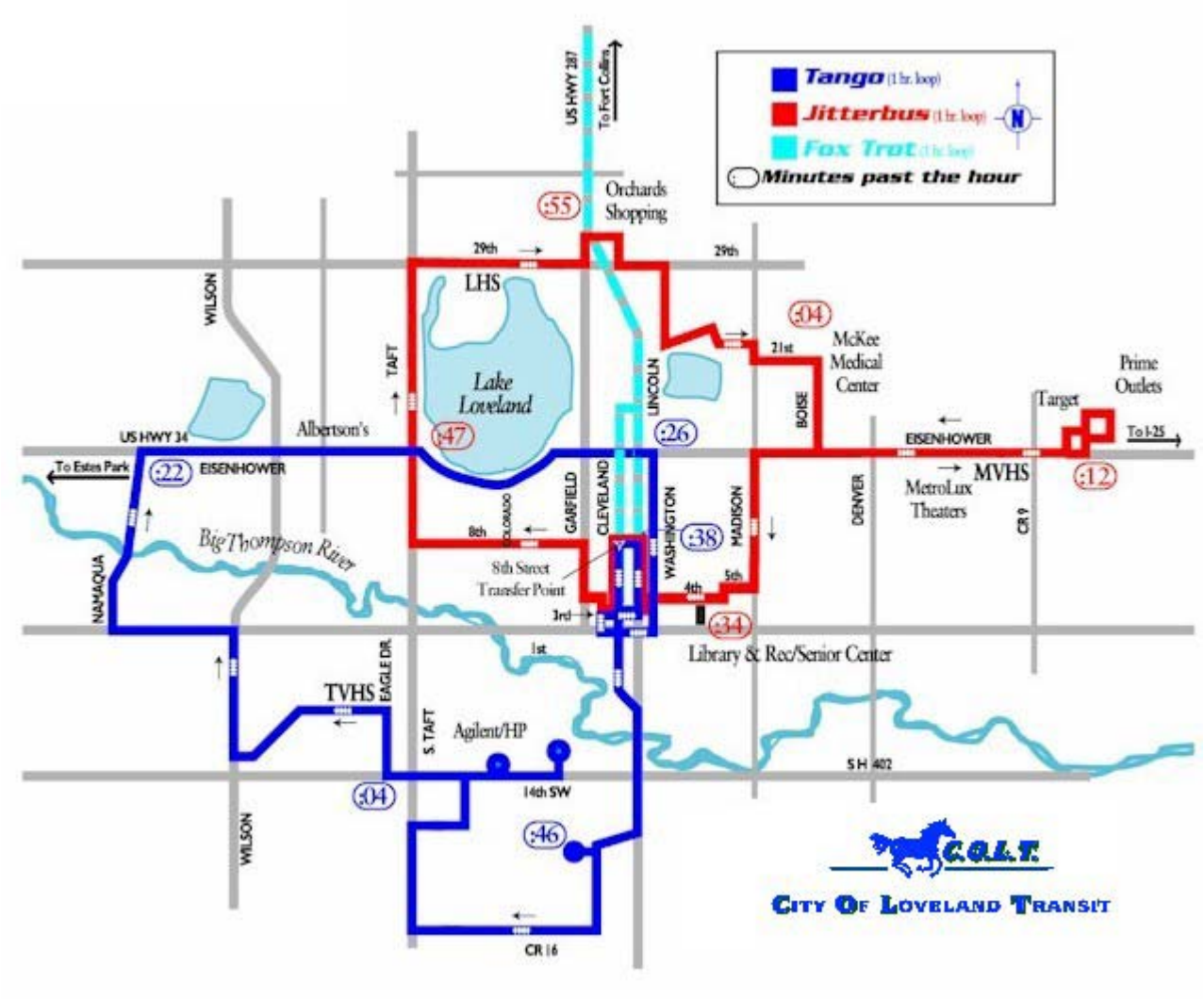
GreeleyGOV → Department → TRANSIT SERVICES - THE BUS → Home

All City of Greeley Bus Routes

Where do you want to go to today?

Below is a full view map of the Fixed Route System. You may click on a portion of the map to take you to a detailed view of that route.




Tango (1 hr. loop)
Jitterbus (1 hr. loop)
Fox Trot (1 hr. loop)
Minutes past the hour
N
US HWY 287
To Fort Collins
:55
Orchards Shopping
29th
29th
LHS
WILSON
TAFT
Lake Loveland
:47
:04
21st
McKee Medical Center
LINCOLN
:26
BOISE
Prime Outlets
Target
To I-25
US HWY 34
Albertson's
EISENHOWER
To Estes Park
:22
EISENHOWER
MVHS
:12
MetroLux Theaters
CR 9
DENVER
Big Thompson River
8th
COLORADO
GARFIELD
CLEVELAND
WASHINGTON
:38
MADISON
NAMAQUA
5th
4th
3rd
8th Street Transfer Point
:34
Library & Rec/Senior Center
1st
EAGLE DR
TVHS
S TAFT
Agilent/HP
SH 402
14th SW
:04
:46
WILSON
CR 16
C.O.L.T.
City Of Loveland Transit

NORTH I-25 EIS
information. cooperation. transportation.

MEMORANDUM

To: Chris Primus, Carter-Burgess
Elliot Sulsky, Felsburg Holt & Ullevig

From: Debbie Weaver, Felsburg Holt & Ullevig

Date: October 21, 2004

Subject: Transit Modeling in the North I-25 EIS

The North I-25 EIS conducted by the Colorado Department of Transportation in conjunction with the Federal Highway Administration and Federal Transit Administration concerns travel demand between and within the North Front Range Metropolitan Planning Organization (NFRMPO) and Denver Regional Council of Governments (DRCOG) planning areas. As a result, the two travel demand models from the two planning areas are being combined into one to appropriately model travel behavior for the study. A major aspect of modeling for this study is the consideration of transit in the alternatives. As a result, transit must be included and appropriately calibrated in the newly created combined model for it to be considered in alternatives for the study. The purpose of this memo is to document the process of developing the transit portion of the model.

The two base year models being combined from the respective planning organizations are the 2001 DRCOG TransCAD model with the 2000 NFRMPO TransCAD model. The 2001 DRCOG model included all the transit routes for its modeling area. However, the 2000 NFRMPO model did not include any of its transit routes. As a result, the first step in combining the transit route systems from the respective planning areas was to code the NFRMPO transit routes into the combined model. Because the DRCOG transit routes were already included in the combined model and the DRCOG route system is far more complex than any transit system in the North Front Range (NFR), the DRCOG format for coding and establishing parameters was used to code the NFRMPO transit routes into the combined model.

Because it has not been determined what year of calibration would be used for the model, information from year 2004 transit route schedules and maps was input into the combined model because this data is readily available via the internet and other sources. However, since coding was completed, year 2001 transit route schedules and maps have been obtained from the City of Fort Collins transit system (Transfort) that show some significant changes in the transit routes between 2001 and 2004. Thus, if year 2001 data is used to calibrate the model, we may want to edit the transit routes to reflect these changes. The City of Loveland transit system (COLT) has not changed significantly regarding either route schedules or maps since

2001. The City of Greeley transit route system (the BUS) has not changed significantly either. Moreover, the BUS had a major computer upgrade between 2001 and 2004 and lost all their ridership data for 2001. Thus, this could be a factor in looking at calibration results. Since coding at least initially has been completed for the combined model, the next step is to set new transit parameters or use the transit parameters from the DRCOG model when modeling the transit routes.

When coding transit networks, there are two main files in the DRCOG model that show the transit parameters used in creating the transit skims and transit networks on which the transit shortest path and assignment algorithms are based. These tables are the modes.dbf and modexfer.dbf files. The modes.dbf file is the main table on which the transit shortest path and assignment algorithms are based and has a number of parameters used in the model. The modexfer.dbf file merely records the average fare paid when transferring between modes in the transit route system. These tables are both found on the following pages.

Because the modes.dbf table contains most of the transit parameters used in the model, this file needs more discussion. The table below lists all the parameters in the modes.dbf table as indicated by the parameter's field name with a description of each parameter's function.

Parameter	Function
MODE_NAME	Service Type from DRCOG model. No new service types were created in coding NFR transit routes. This field is descriptive only.
MODE_ID	Unique number assigned to each Service Type that is input into the MODE field in the Route Systems table.
MODE_USED	Dummy variable indicating whether mode is being used in that model run.
MODE_ACC	Dummy variable indicating whether the mode is one of access (1) to a transit mode or a transit mode itself (0).
IMP_FIELD	Mode-specific link travel time field referring to its respective field in the transit network file. This field is calculated as a function of the time factor parameters found in the model code and the peak or off-peak dwell time.
FARE_TYPE	Variable indicating whether fare type for this mode is a flat fare (1) or a zonal fare (2).
FARE_CORE	Name of matrix core for zonal fares if applicable.
HEADWAY	Default headway used for each mode if the headway is not present in the Route Systems table.
SPEED	Default speed used for each mode if travel times are missing.
FARE	Average fare paid to board any route in this mode in 1996$.
XFER_FARE	Reduced fare paid when transferring from this flat fare route to another flat fare route in 1996$. See modexfer.dbf table for fares.
PK_DWELL	The dwell time at each stop in the peak in minutes by mode.
OP_DWELL	The dwell time at each stop in the off-peak in minutes by mode.

Parameter	Function
MAX_PT	The maximum transfer penalty in minutes. Rail is the only mode with a maximum transfer penalty (8 minutes).
LK_I_W	Weight on in-vehicle link travel time. Note that the Rail travel time weight is less because many perceive rail takes less time to travel. Conversely, the Walk and Transfer weights are greater because these modes are often perceived to take longer to travel.
DWELL_W	Weight applied to dwell times. Values and logic are the same as the LK_I_W field.
XFER_W	Weight applied to transfer times. Note that the values here are greatest for the local service types because these routes have traditionally longer travel times. Routes with faster travel times have lower weights.
WAIT_W	Weight applied to waiting times. Values and logic are the same as the XFER_W field.
XFER_P	Time penalty for transferring to this route in minutes. For all transit modes this parameter has a value of 1 minute. This parameter accounts for the amount of time it takes to cross the street when transferring between routes. There is still a transfer penalty of half the headway known as the interarrival parameter that accounts for waiting for the next route. The interarrival parameter is implicit in the Pathfinder algorithm method instead of being explicitly defined in the model code.
DWELL_P	The proportion of boarding time as part of the total dwell time. Note that for all transit modes the boarding time takes up 50% of the total dwell time.
MIN_WAIT	Minimum wait time by mode in minutes. This is the minimum amount of time that you have to wait before transferring to the next transit route. Notice that for all transit modes the minimum wait time is 2 minutes except for the Mall Shuttle to account for bus bunching that often occurs when buses are scheduled at less than 4 minutes apart. The Mall Shuttle during the peak has headways of about 75 seconds so it was deemed unnecessary to have a minimum wait time on this mode.
MAX_WAIT	Maximum wait time by mode in minutes. This is the maximum amount of time that you would have to wait before transferring to the next transit route. Only routes N and L in the combined model have headways greater than 60 minutes at 120 minutes. Most people would not wait longer than 60 minutes to transfer to a route.
MAX_ACCESS	This is the maximum amount of time allowed to access this mode that is calculated by a default 0.51 mile walk distance multiplied by a default walk speed of 3 miles per hour or 20 minutes per mile. Notice that for faster transit modes such as Express bus routes, a maximum walk distance of 1.0 mile is allowed.
MAX_EGRESS	This is the maximum amount of time allowed to egress this mode. The same logic applies as the MAX_ACCESS field.
MAX_TIME	This is the maximum amount of time allowed to travel on any mode in minutes with a maximum of 300 minutes or 5 hours allowed per mode.

In general it was assumed that the NFR transit routes would assume the parameters of one of the DRCOG model local bus service types represented by the Denver Local, Denver Limited, Longmont Local, and Boulder Local bus modes because all the NFR transit routes are relatively

short in length and run on local streets with frequent stops that is characteristic of any of the local bus services. In contrast none of the routes run on highways with infrequent stops that is characteristic of the Express, Regional, and skyRide bus modes. The differentiating factor among the local bus service types is primarily their fares with the Denver Limited bus service also having different peak and off-peak dwell times. Because the Denver Limited bus service is characterized by fewer stops and therefore less access than the Denver Local, Longmont Local, and Boulder Local bus services, it is assumed the peak and off-peak dwell times from the latter bus services more closely approximate service on the NFR transit routes in the combined model than the Denver Limited bus service dwell times.

In order to code the NFR transit routes correctly, the last factor that needs to be considered is the average fare paid per rider for each of the NFR transit route systems, i.e. Transfort, COLT, and the BUS, and whether a new mode or modes need to be determined to properly code the routes. FHU has done much transit work in the NFR including the completion of the draft of the NFRMPO Regional Transit Element in 2004. The NFRMPO Regional Transit Element contains fares paid and ridership data for each of the NFR transit systems for year 2001 and other years. However, some transit systems keep better records than others. Year 2004 data is not yet available because year 2004 is not yet complete. Both Transfort and the BUS have total fares paid and total ridership data for year 2001. A simple division of total annual fares paid by total annual ridership gives the average fare paid per rider in 2001 that was $0.44 for Transfort and $0.42 for the BUS. The COLT transit system did not have reliable fare data for 2001 so this calculation could not be completed. Because the fares in the DRCOG model are in 1996 dollars, the 2001 average fare paid per rider for Transfort and the BUS also needed to be expressed in 1996 dollars to model the routes correctly.

In order to express the average fare paid per rider in 1996 dollars, the percent change in the Consumer Price Index for All Urban Consumers (CPI-U) from 2001 to 1996 needed to be determined. The CPI-U was used instead of the CPI-W (Consumer Price Index for Urban Wage Earners and Clerical Workers) because the CPI-U "is based on the expenditures of almost all residents of urban or metropolitan areas, including professionals, the self-employed, the poor, the unemployed and retired persons as well as urban wage earners and clerical workers."[1] On the other hand the CPI-W "is based on the expenditures of households that are included in the CPI-U definition that also meet two requirements: More than one-half of the household's income must come from clerical or wage occupations and at least one of the household's earners must have been employed for at least 37 weeks during the previous 12 months."[2] Because the CPI-W is a subset of the CPI-U with the CPI-U representing most consumers in metropolitan areas, it seems the CPI-U is the more appropriate measure to adjust transit fares for the NFR.

[1] Http://stats.bls.gov/cpi/cpifaq.htm
[2] Http://stats.bls.gov/cpi/cpifaq.htm

A search of the Bureau of Labor Statistics website yielded CPI-U index values particular to the Denver-Boulder-Greeley, Colorado area which for 1996 and 2001 are 153.1 and 181.3 respectively. Because the CPI-U is an index, the percent change must be figured by subtracting the 2001 value of 181.3 points from the 1996 value of 153.1 points to yield a change in index points of -28.2 which then must be divided by the original 2001 index value of 181.3 points and multiplied by 100 to provide the percent change of -15.6%. Because we must revert the 2001 average fare paid per rider back to 1996 dollars, both the Transfort $0.44 fare and the BUS $0.42 fare were reduced by 15.6% to $0.37 and $0.36 respectively.

With the fares determined in 1996 dollars for the NFR transit systems where possible, we must next look at the modes.dbf table for the DRCOG model to see if any of those modes apply to the NFR transit systems. A look at this table shows that the Boulder Local fare paid in 1996 dollars at $0.37 and the Longmont Local fare paid in 1996 dollars at $0.36 align quite nicely with the fares calculated for the Transfort and the BUS transit systems respectively. Moreover, as discussed earlier the other parameters for the Boulder and Longmont Local bus services apply to the Transfort and the BUS transit systems. Thus, it seemed appropriate to give the Transfort bus routes the mode number 12 used for the Boulder Local routes and the BUS bus routes the mode number 11 used for the Longmont Local routes. Because we do not have reliable 2001 fare data for the COLT transit system, the simplicity of the COLT transit system seems to suggest a lower transit fare, the COLT transit system is the closest to Longmont of any of the NFR transit systems, and the BUS transit system with a Longmont Local fare is the next closest transit system to Longmont, it seemed appropriate to give the COLT transit routes a mode number of 11 also.

This memo summarizes the rationale used to code the NFR transit routes into the combined DRCOG-NFRMPO model for the North I-25 EIS. However, other factors need to be considered when calibrating the model in regard to the transit routes. First, it seems we still need to determine an appropriate model calibration year for inputting appropriate transit fares, routing, and schedules and also for comparison of modeled vs. observed results. Second, we also may need to review some of the transit parameters. The peak and off-peak dwell times provided in the 2001 modes.dbf table were carried over from the older DRCOG MINUTP model. These transit parameters were determined by running the model over and over again with varying sets of transit parameters until the modeled bus route running times closely approximated actual bus route running times. The process to refine the transit parameters needs to be defined for the EIS. Moreover, due to problems in the original release of the mode choice section of the DRCOG TransCAD model, these and other parameters are currently being revised in an update to the DRCOG model that, of course, will particularly affect transit routes.

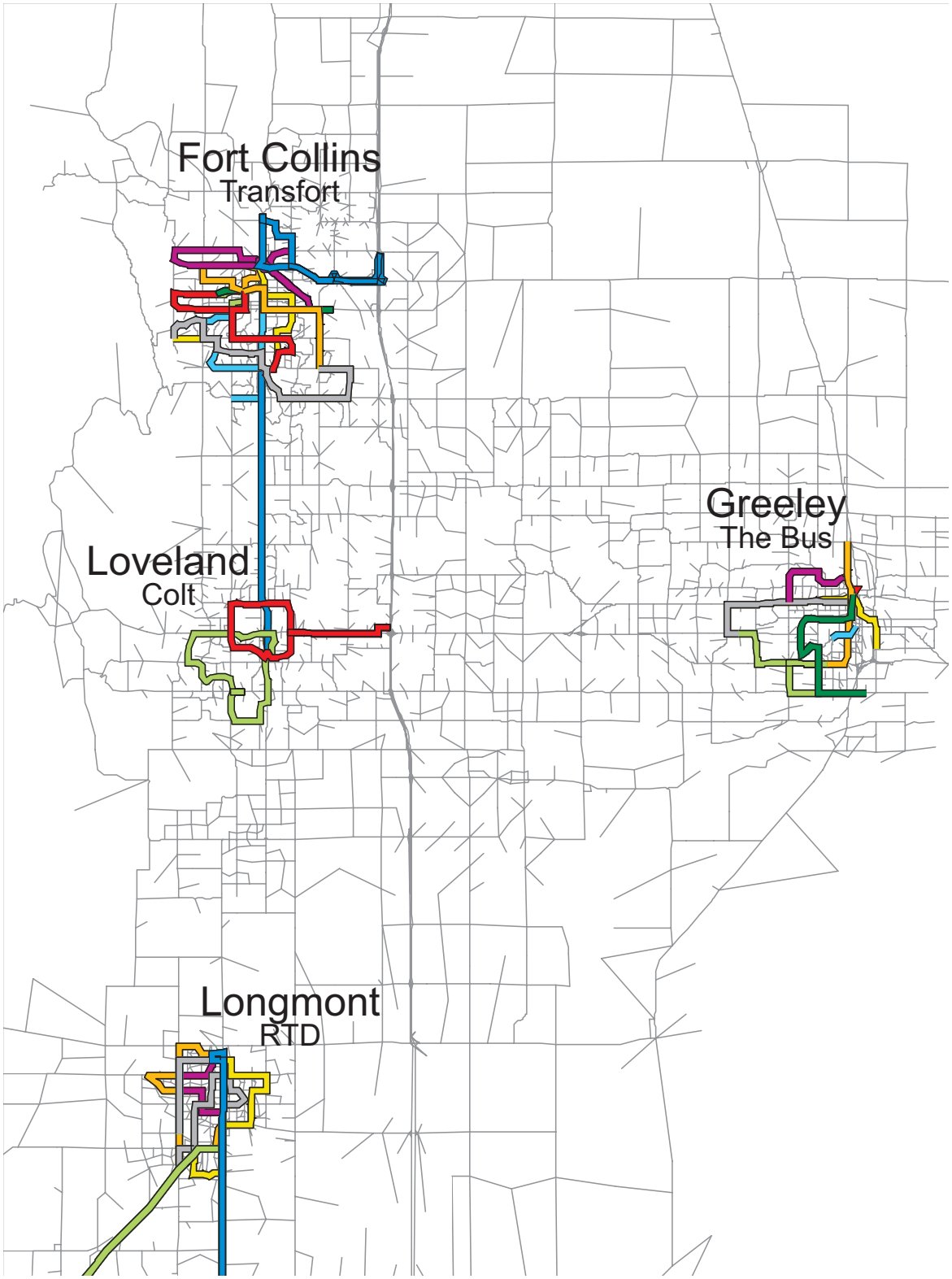
All questions about this memo should be directed to Debbie Weaver at 303-721-1440 or debbie.weaver@fhueng.com.

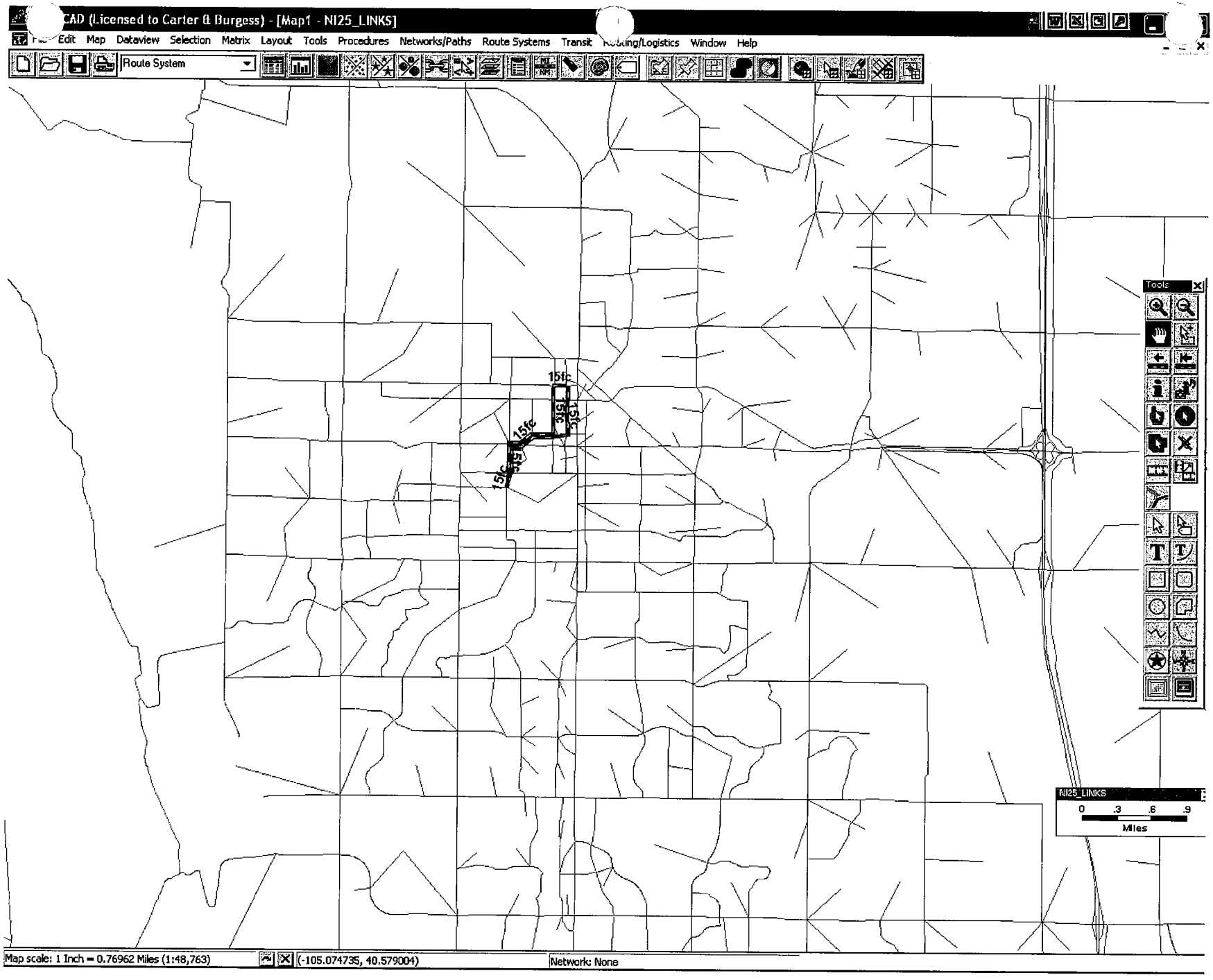
Transfort Bus Route Changes between 2001 and 2004

Route	Routing Change to 2001 from 2004	Degree of Routing Change	2001 Peak Hdwy*	2004 Peak Hdwy*	2001 Off-Peak Hdwy*	2004 Off-Peak Hdwy*
1	No change	None	30	20	30	20
2	route starts and ends at old transit center on CSU campus at University Ave west of Morgan Library and Lory Student Center; old and new CSU transit center locations are very close to each other	Minor	30	30	30	30
3	route goes to old CSU transit center	Minor	30	30	30	30
4	route is longer in 2001 on east side going via Loomis, Mulberry, Canyon, Magnolia, Mason, Maple and Howes	Major	30	30	30	30
5	route alignment is different on south end going via Stuart, Stover, Swallow, and Monroe to the South Transit Center	Major	60	60	60	60
6	route slightly different in north in 2001 with diversion via Pitkin, Whitcomb, and Prospect; going to old CSU transit center	Minor	60	60	60	60
7	route changes much with route going via Shields street in the north and via Lemay, Swallow, and Stover in the south; going to old CSU transit center	Major	30	30	30	30
8	No change	None	30	30	30	30
9	route is longer in 2001 with extension to the southeast via Jefferson and Riverside	Major	60	60	60	60
10	existed in 2001 but not in 2004	Major	60	NA	60	NA
11	route goes to old CSU transit center	Minor	20	20	20	20
14	major change to route on west side with extension going via College, Willox, Conifer, and Lemay; minor change on east side with route going up I-25 a little bit	Major	60	60	60	60
South Side Shuttle	route existed in 2001 but not 2004	Major	75	NA	0	NA
Fox Trot	very minor change with route going straight down Lincoln without diversion to Lincoln	Minor	60	60	60	60
NightLite	route existed in 2001 but not 2004; only operated on Friday and Saturday nights after about 7 PM so does not need to be modeled	NA	NA	NA	NA	NA
15	These routes did not exist in 2001 but do exist in 2004. Routes 91 and 92 are not even modeled in 2004 because they each have just one trip per day.	Major	NA	20	NA	20
64			NA	45	NA	45
91			NA	NA	NA	NA
92			NA	NA	NA	NA

*Headway applies to both directions on the route if applicable. Some routes operate in only one direction.

Existing North Front Range Transit Service

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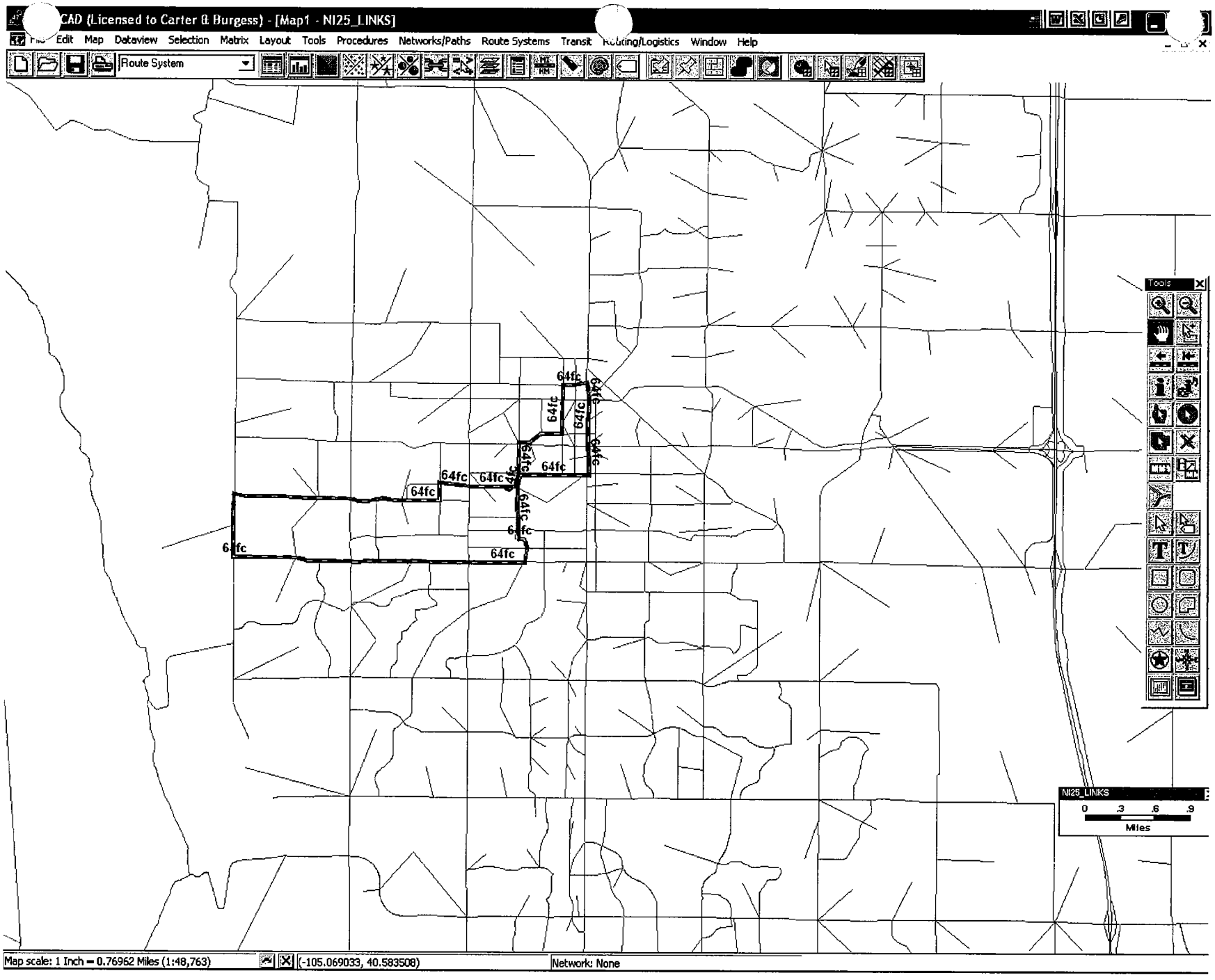
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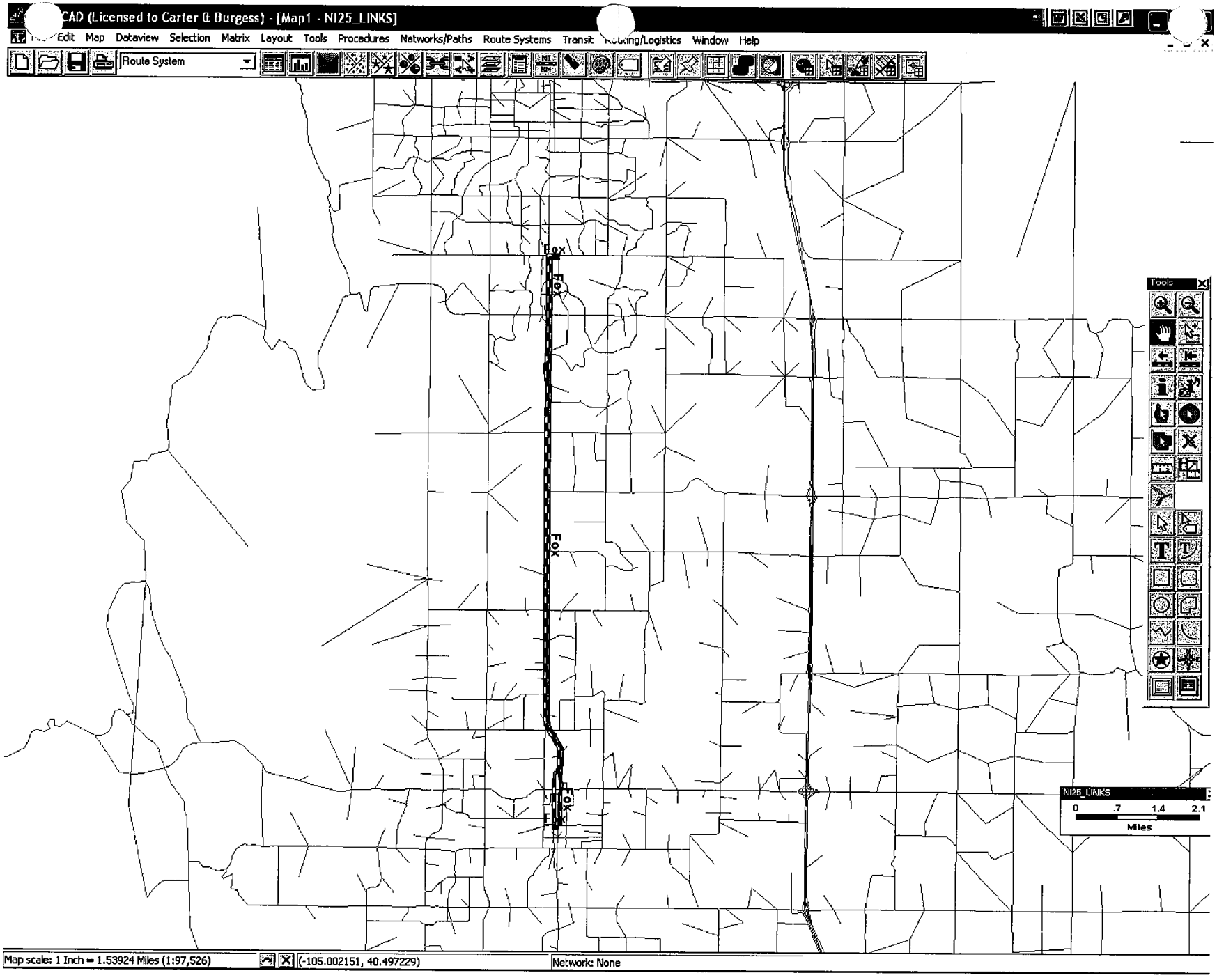
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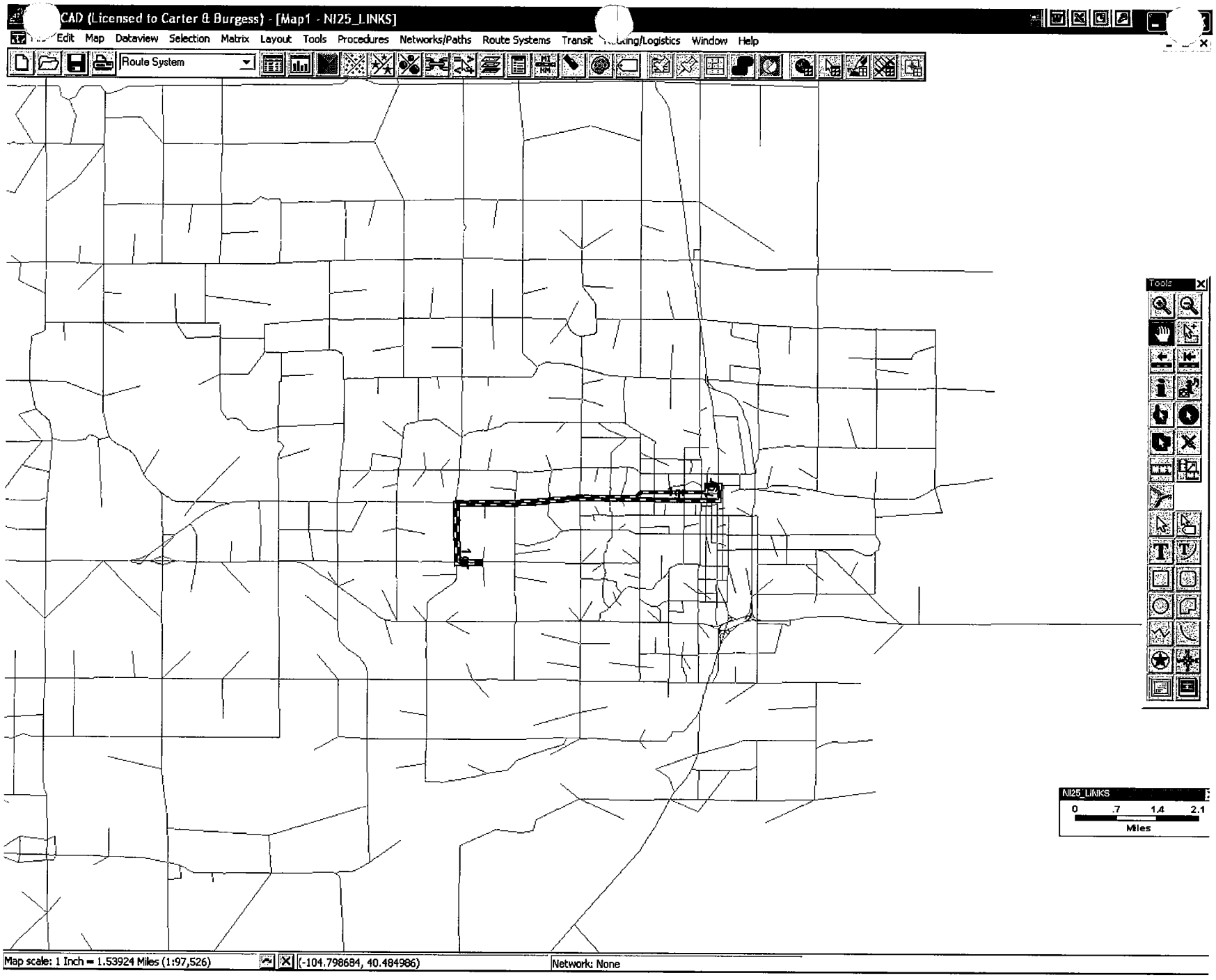
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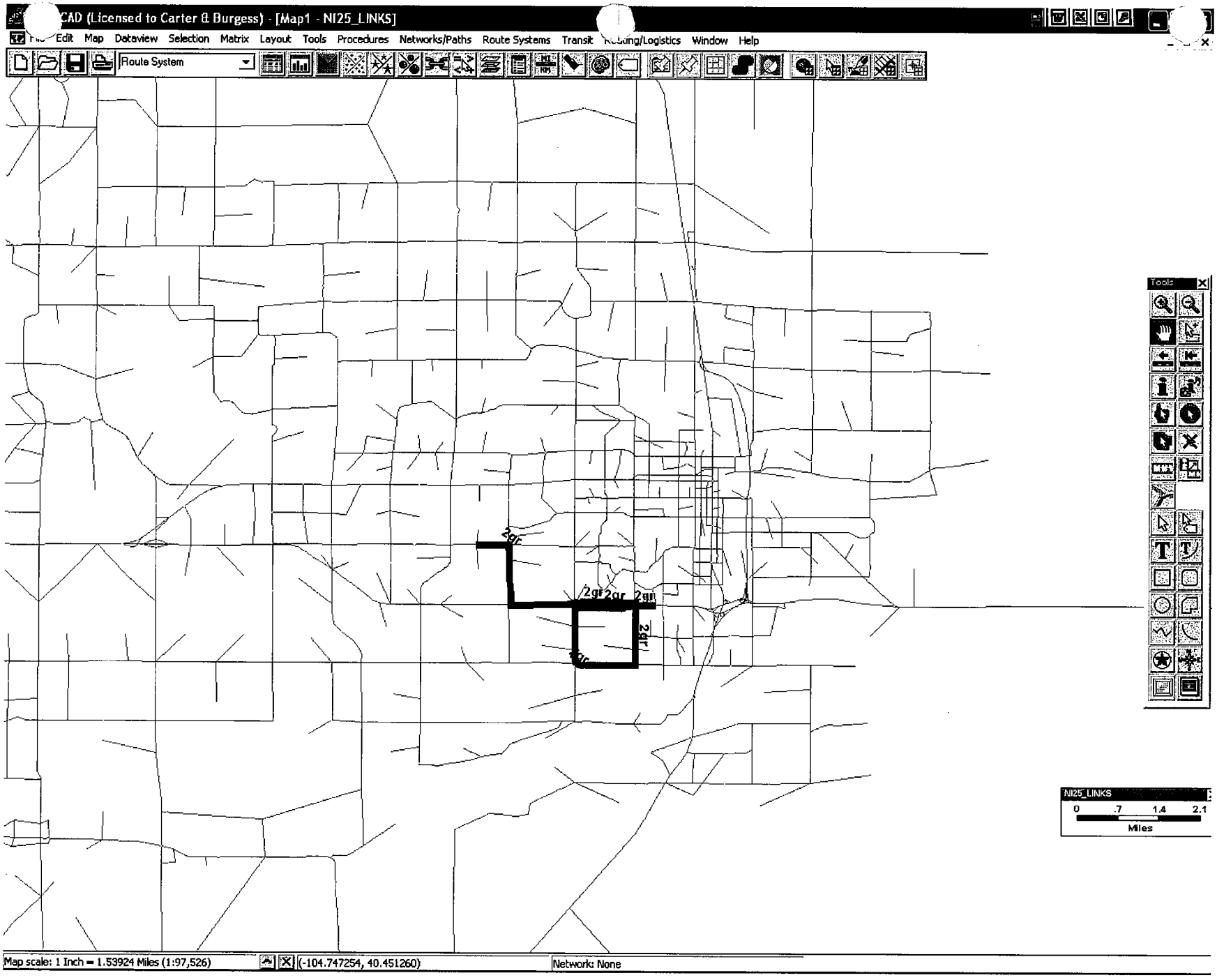
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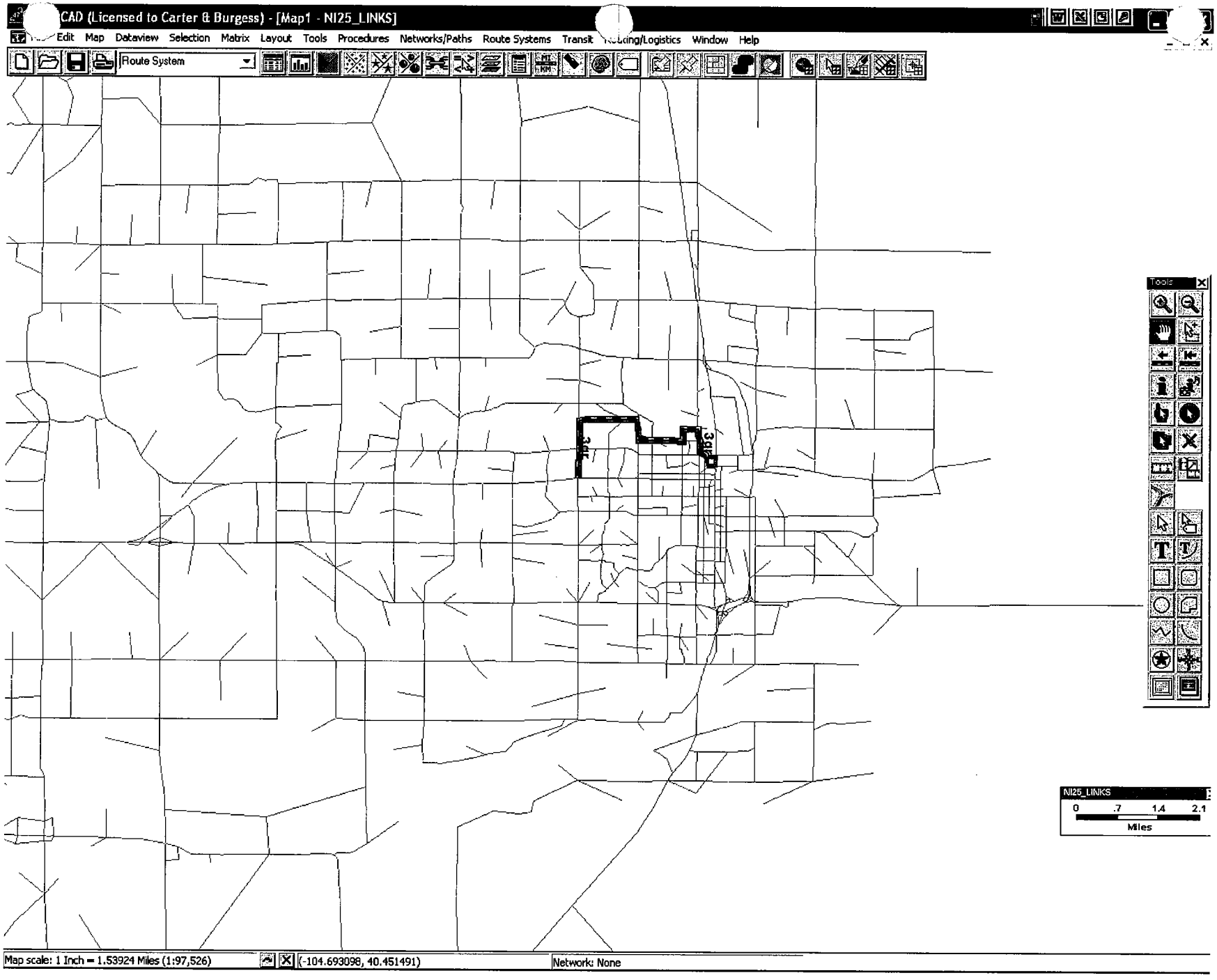
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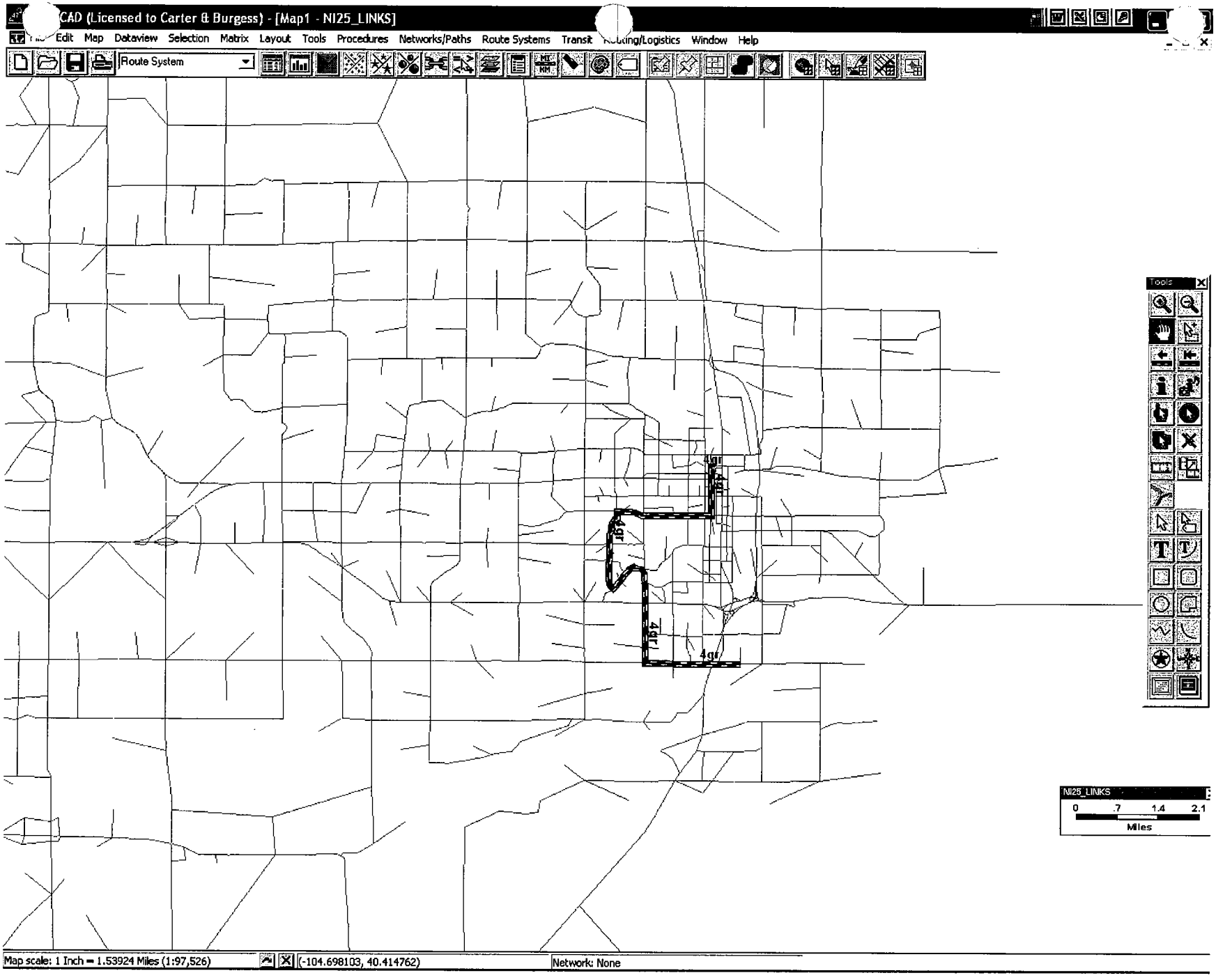
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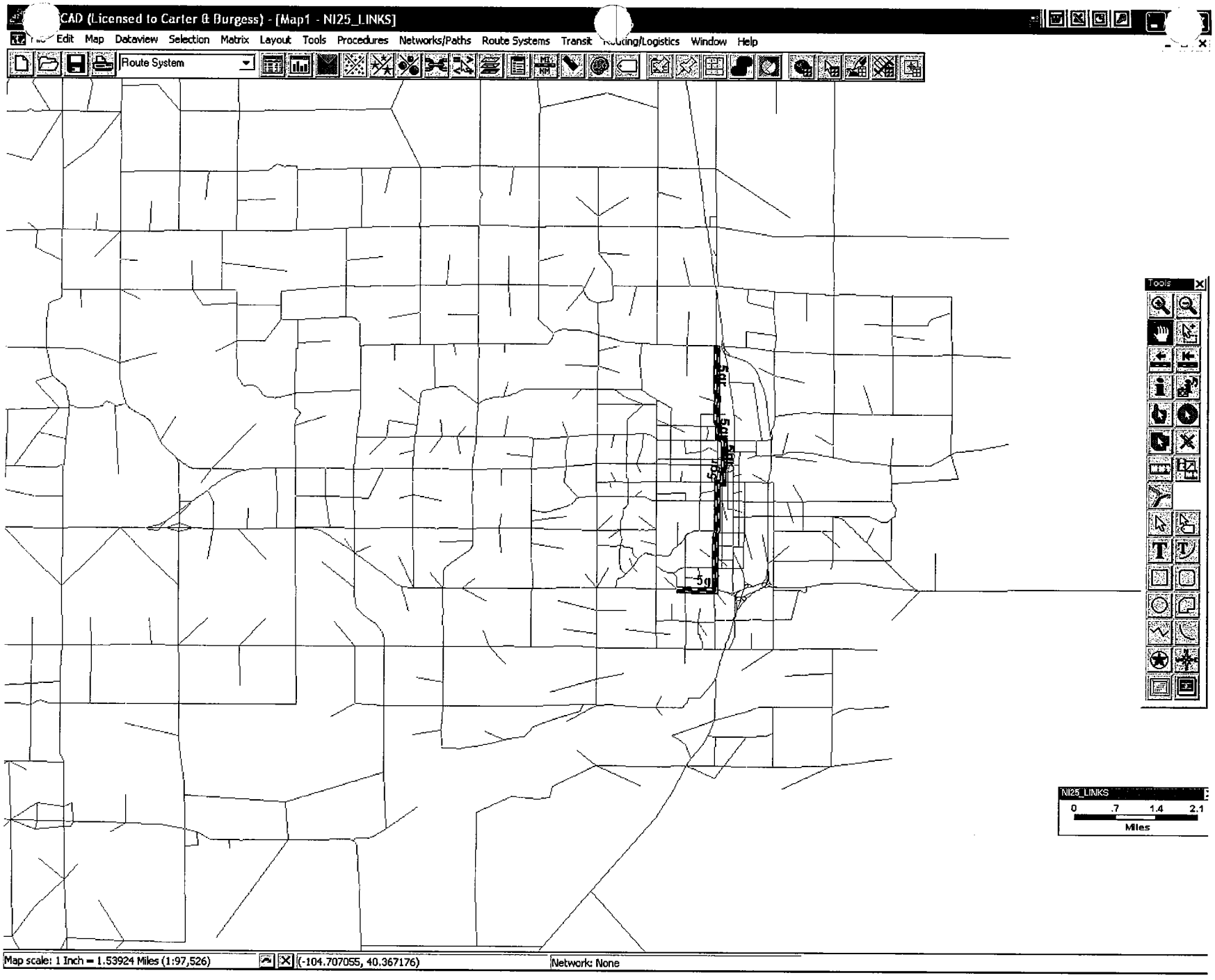
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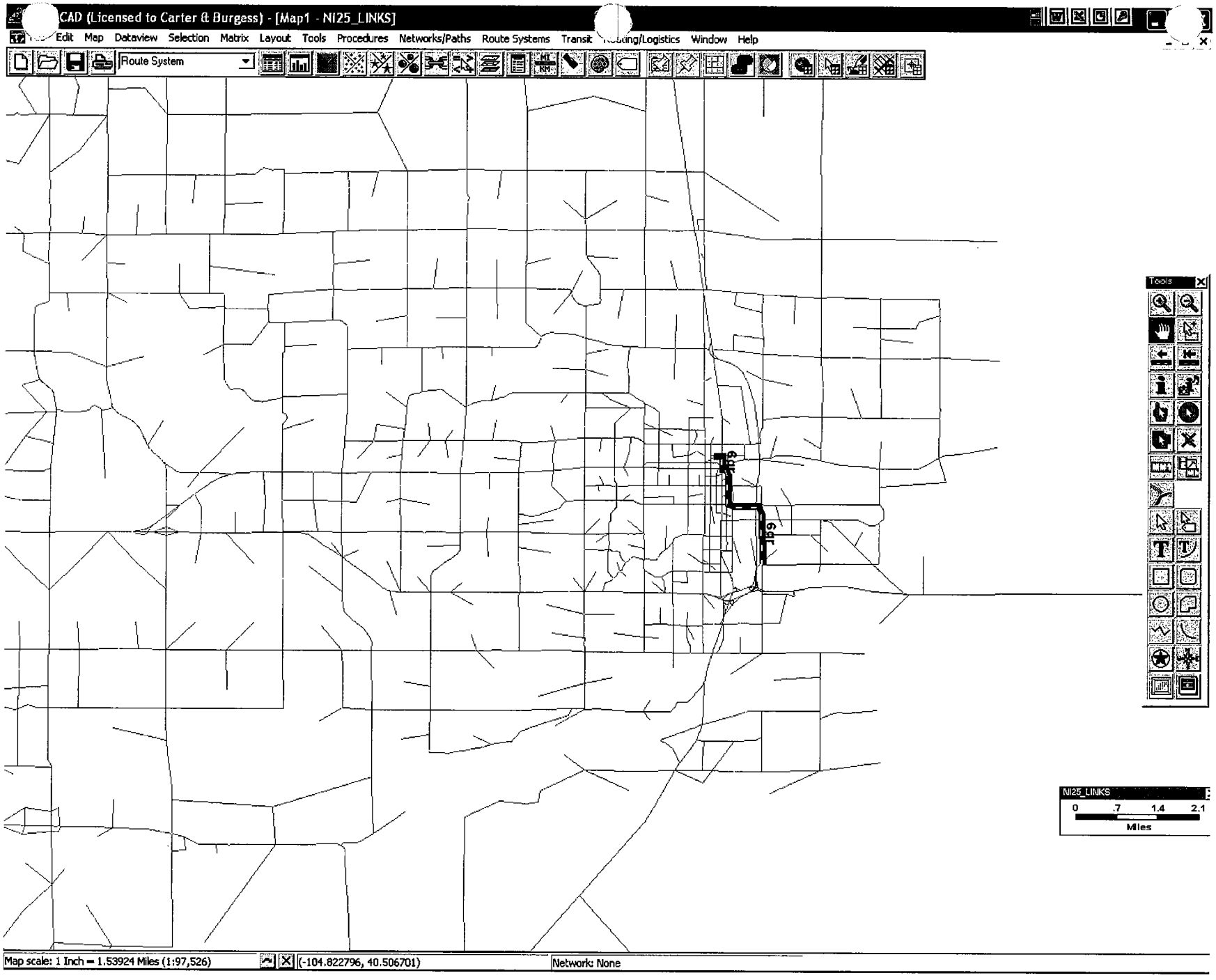
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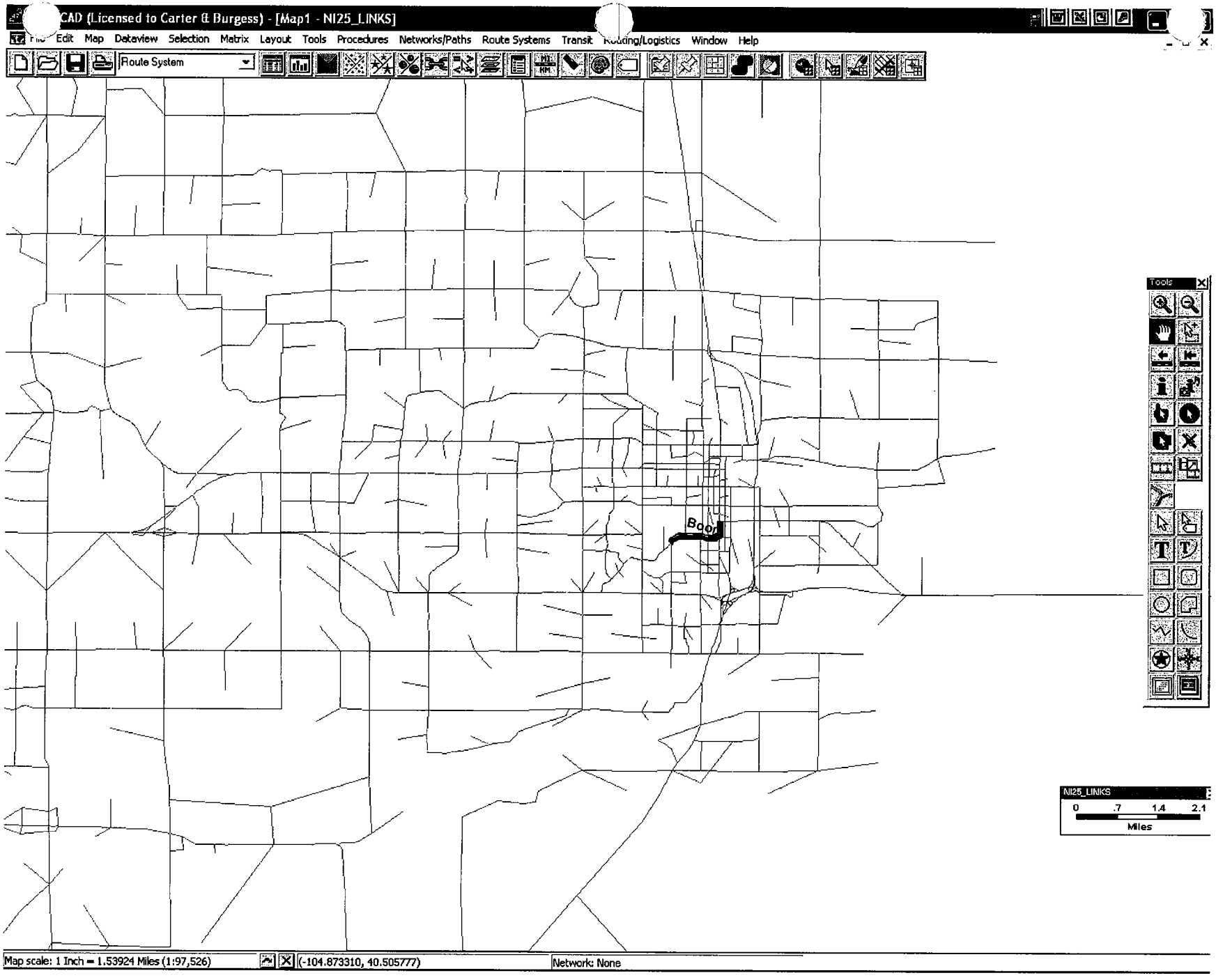
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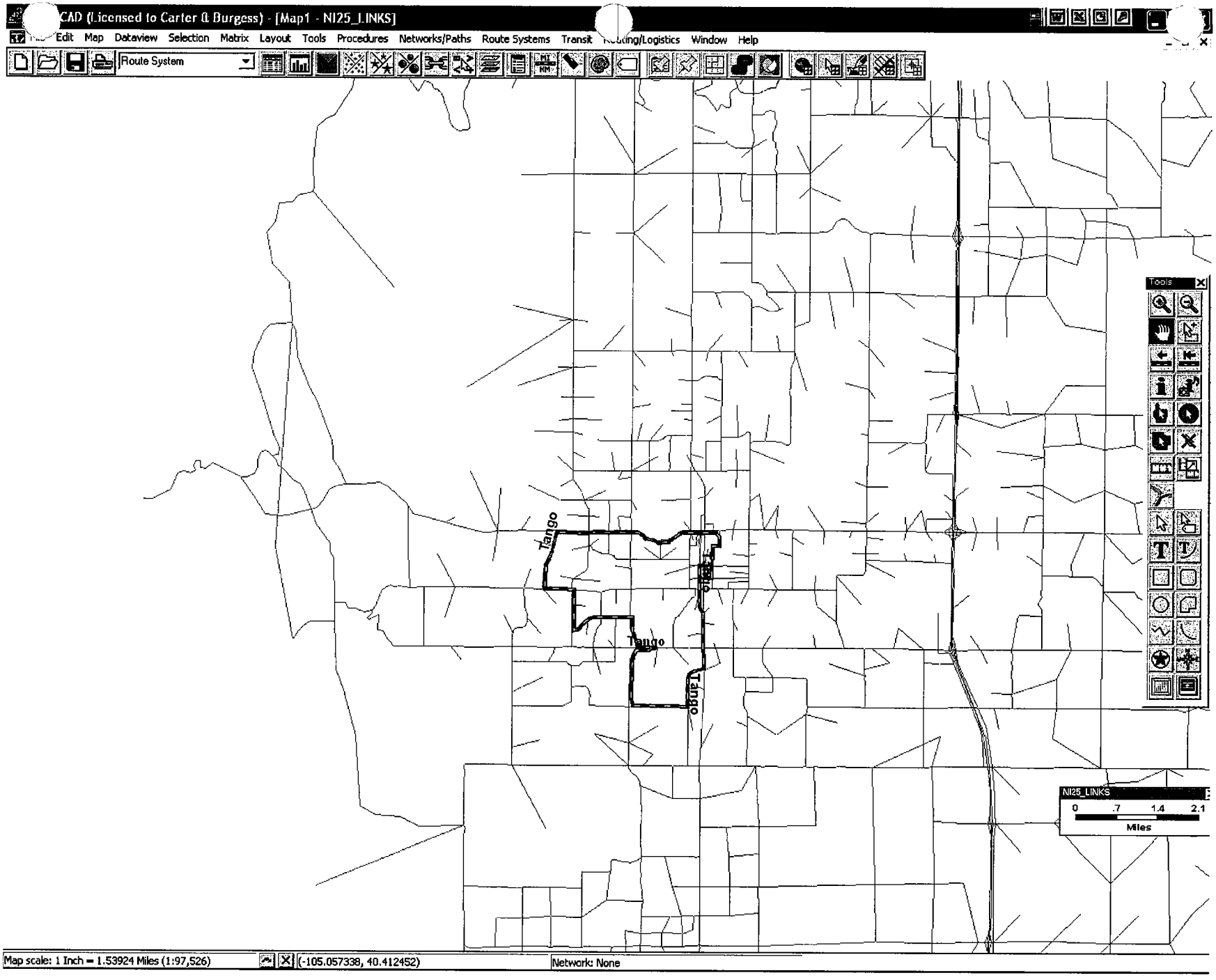
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Miles
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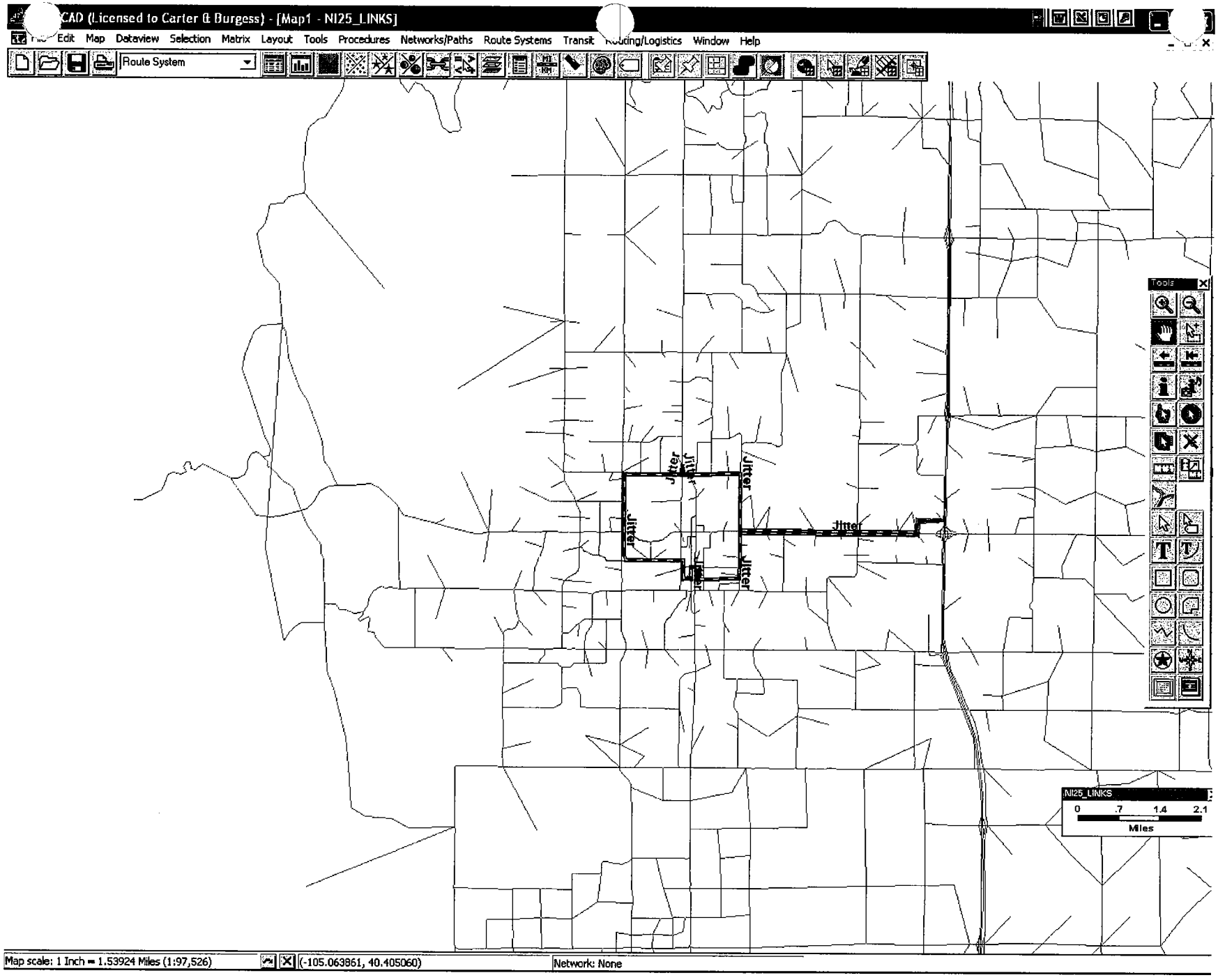
Network: None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Route System
Jitter
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Jitter
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Jitter
Tools
NI25_LINKS
0 .7 1.4 2.1
Miles
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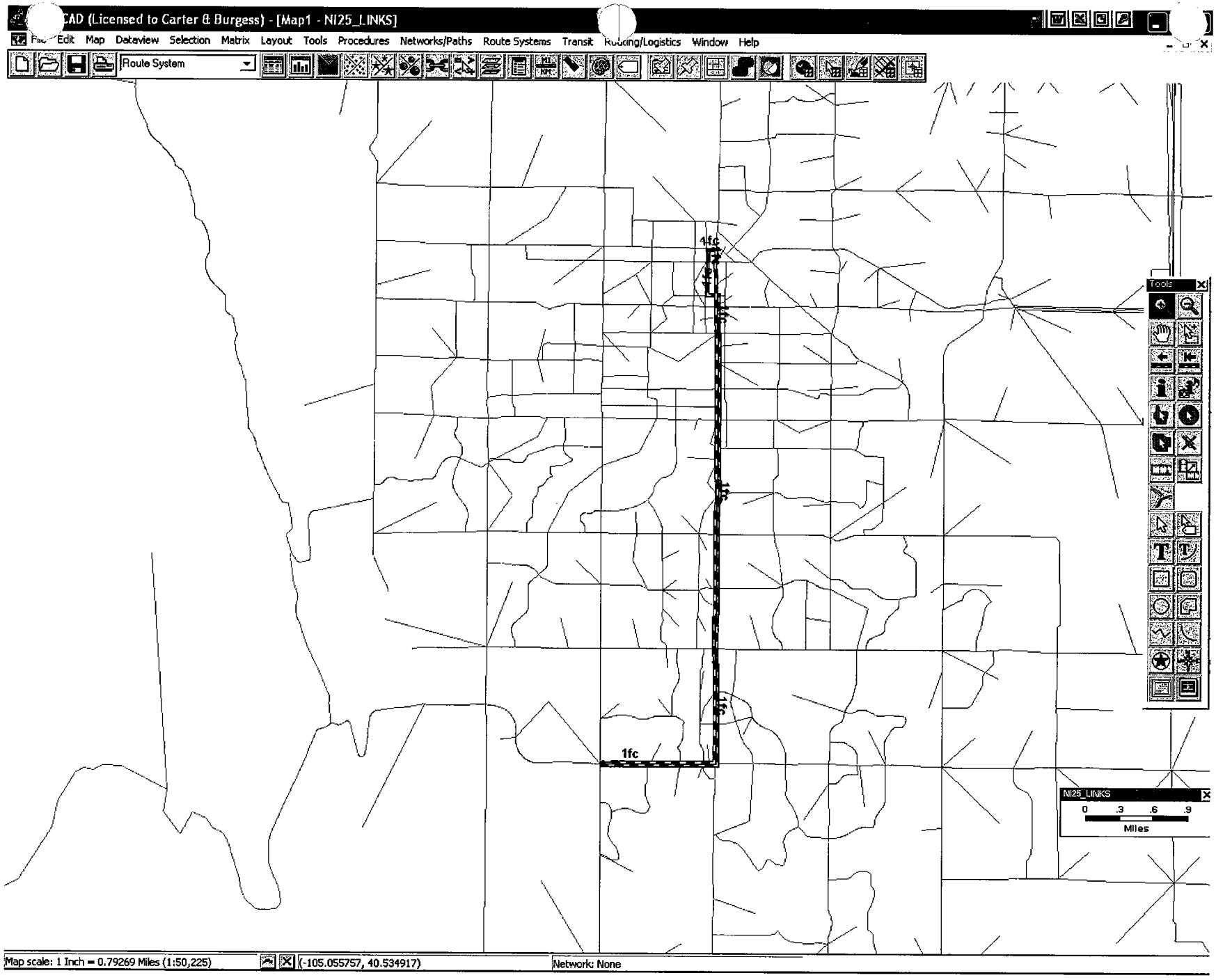
Network: None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Route System
4fc
1fc
1fc
1fc
1fc
Tools
NI25_LINKS
0 .3 .6 .9
Miles
Map scale: 1 Inch = 0.79269 Miles (1:50,225)
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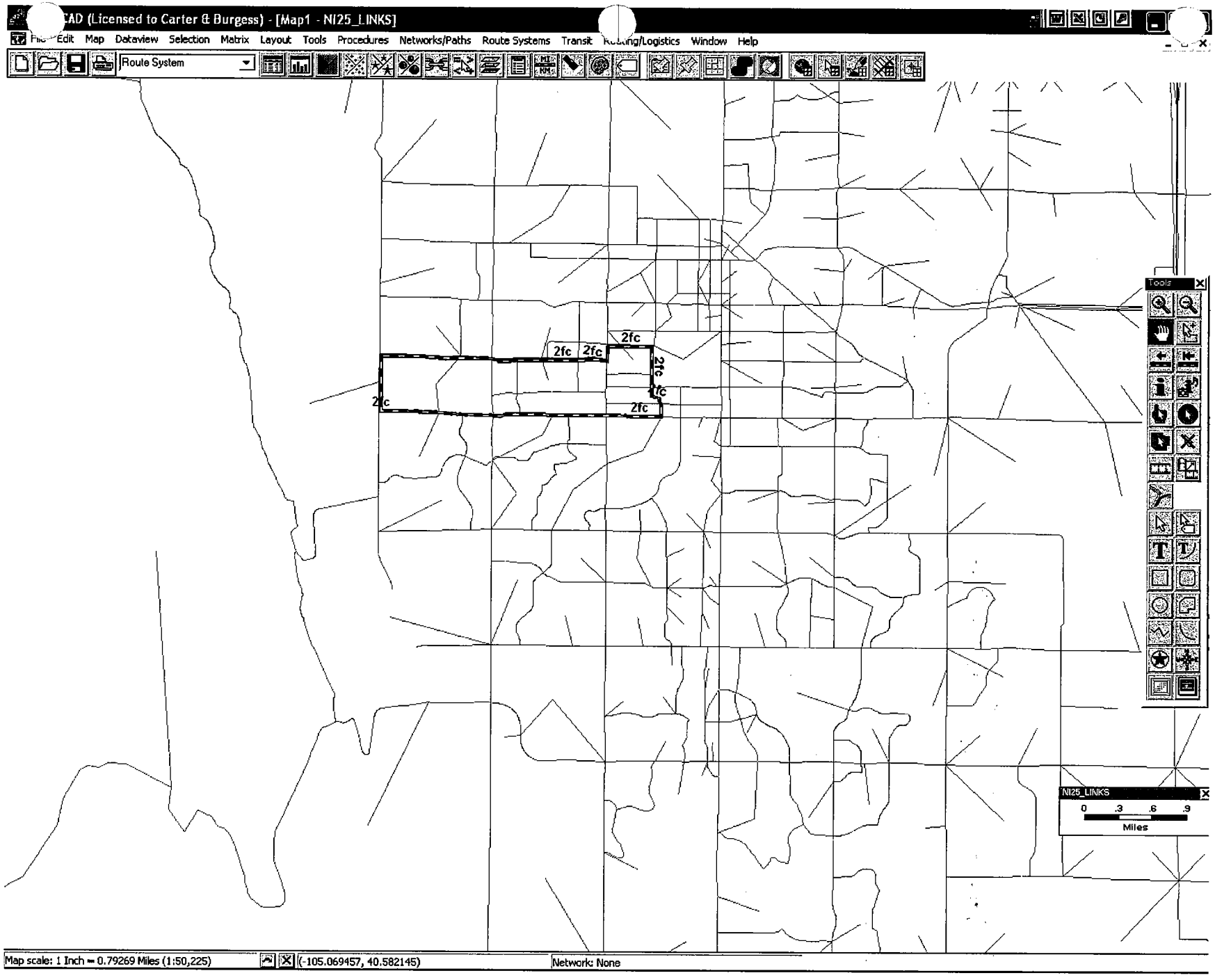
Network: None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Route System
2fc
2fc
2fc
2fc
2fc
2fc
Tools
NI25_LINKS
0 .3 .6 .9
Miles
Map scale: 1 Inch = 0.79269 Miles (1:50,225)
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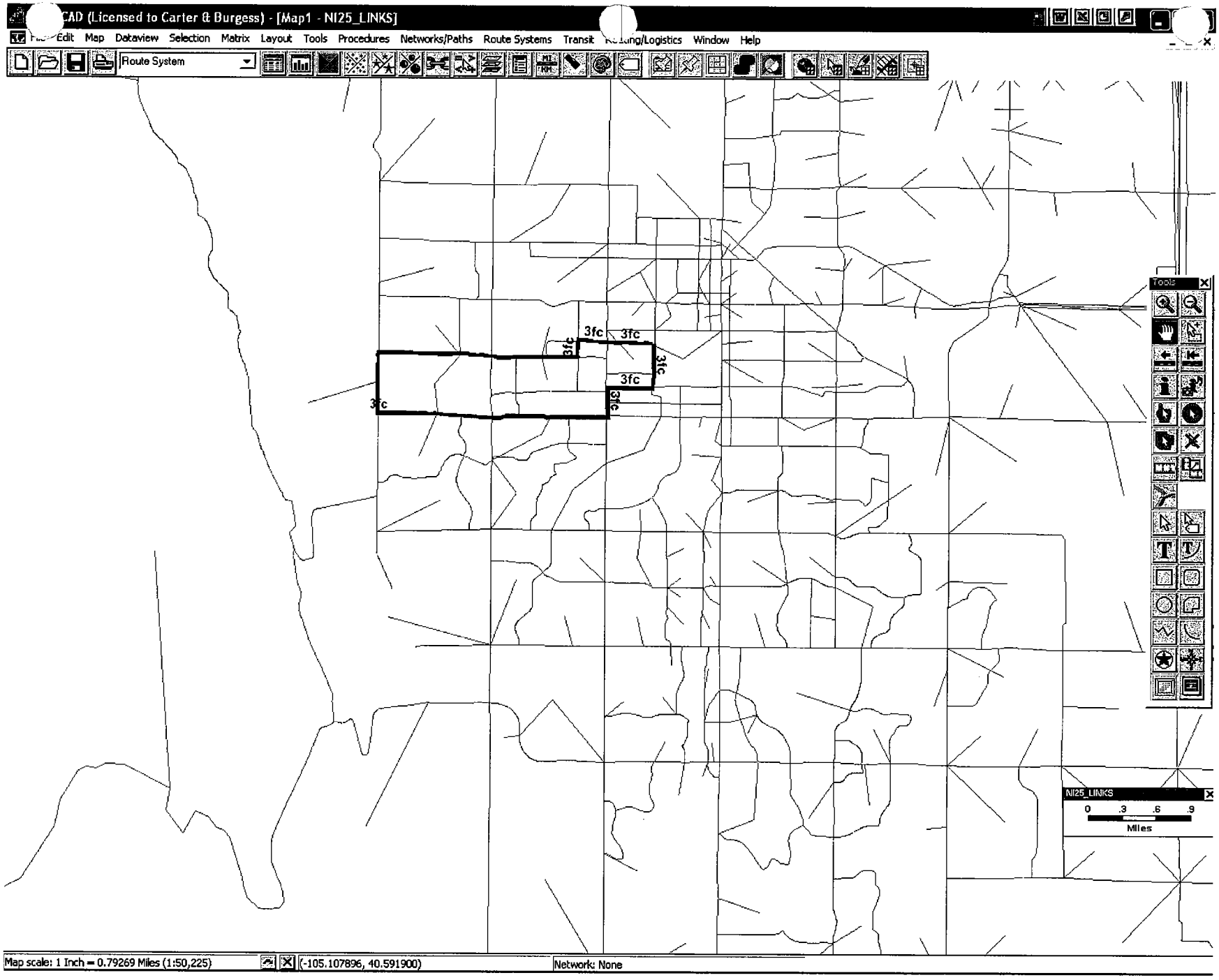
Network: None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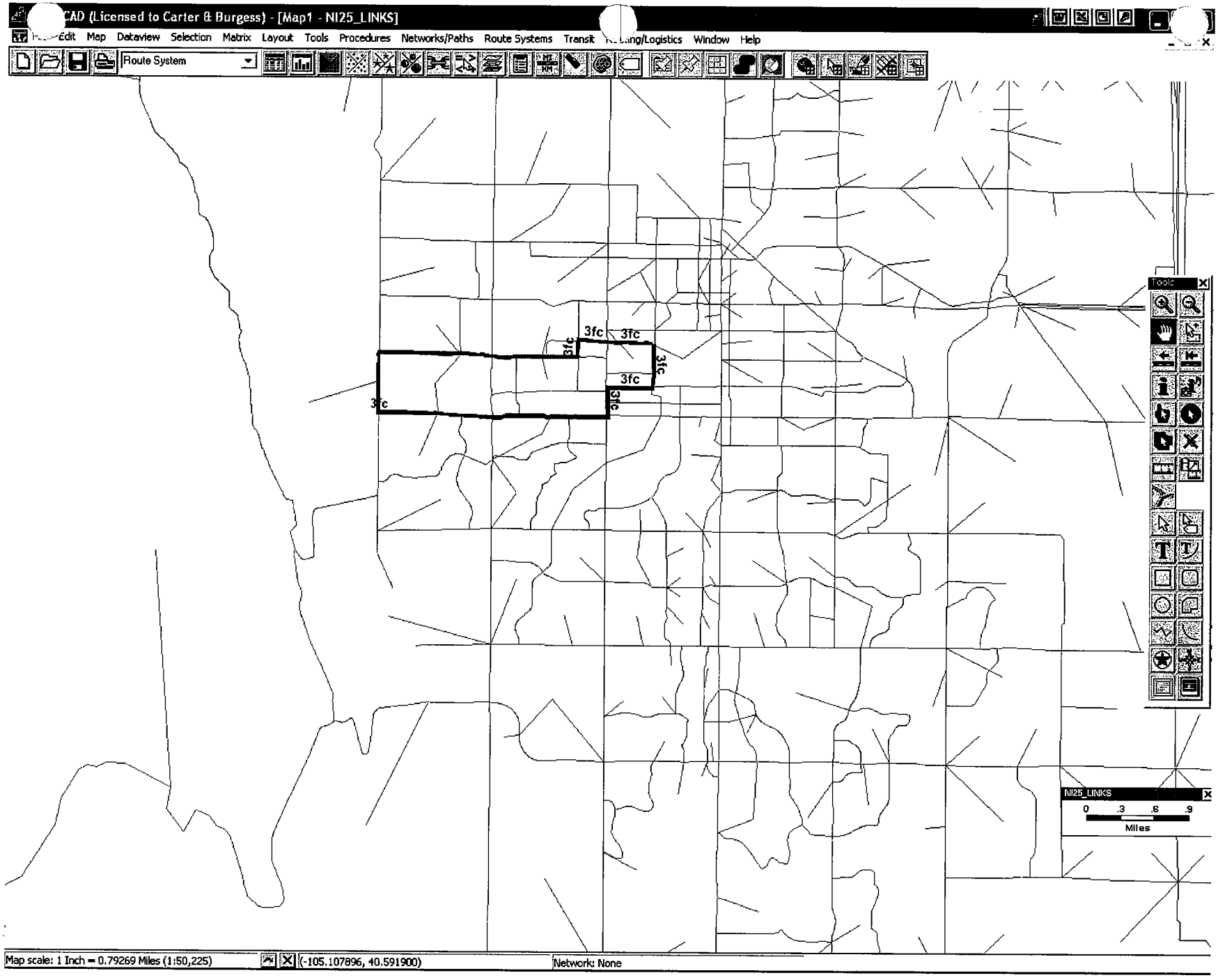
Route System
3fc
3fc
3fc
3fc
3fc
3fc
Tools
NI25_LINKS
0 .3 .6 .9
Miles
Map scale: 1 Inch = 0.79269 Miles (1:50,225)
(-105.107896, 40.591900)
Network: None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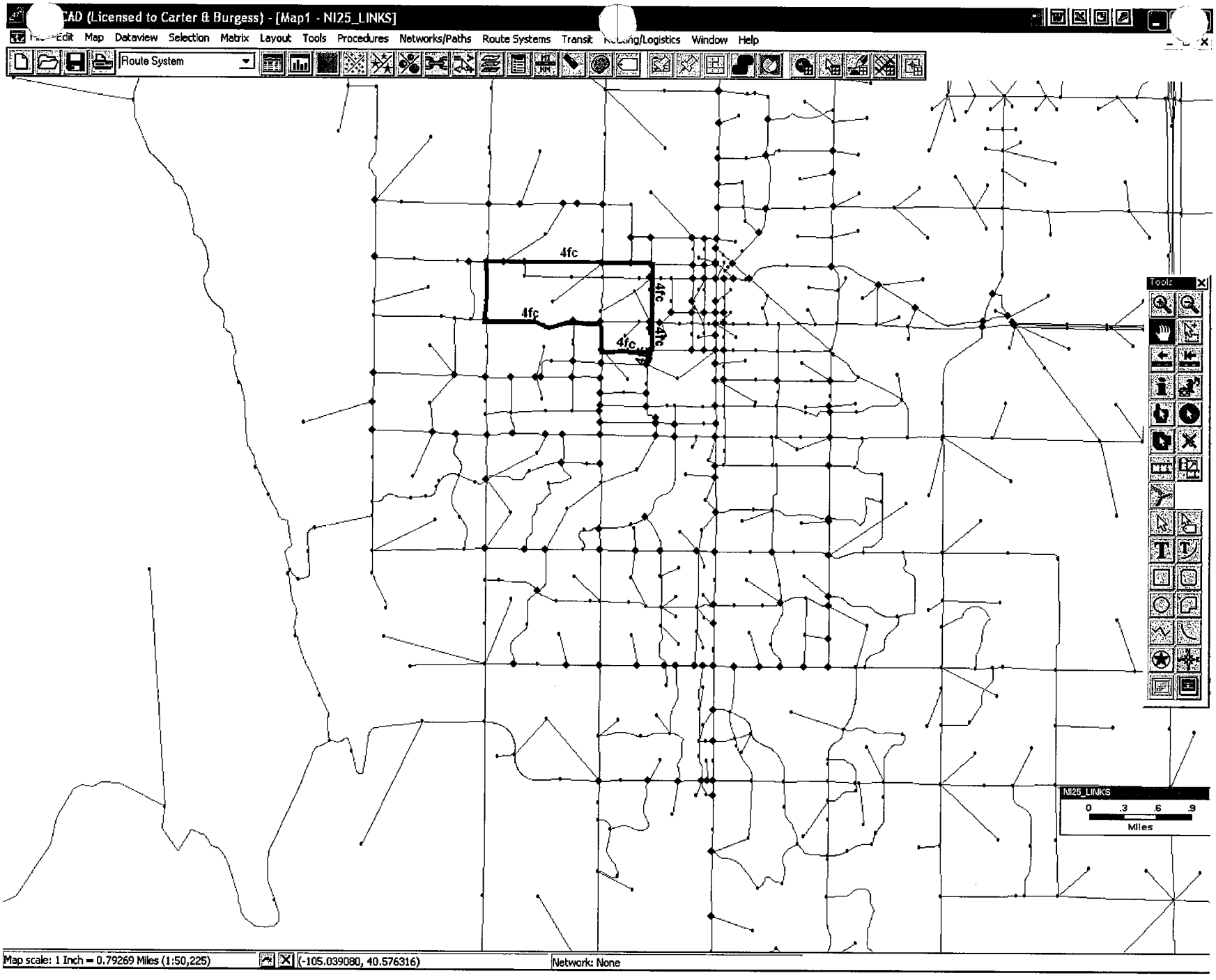
Edit Map Dataview Selection Matrix Layout Tools Procedures Networks/Paths Route Systems Transit Window Help
Route System
3fc
3fc
3fc
3fc
3fc
3fc
Tools
NI25_LINKS
0 .3 .6 .9
Miles
Map scale: 1 Inch = 0.79269 Miles (1:50,225)
(-105.107896, 40.591900)
Network: None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Route System
4fc
4fc
4fc
4fc
4fc
Tools
NI25_LINKS
0 .3 .6 .9
Miles
Map scale: 1 Inch = 0.79269 Miles (1:50,225)
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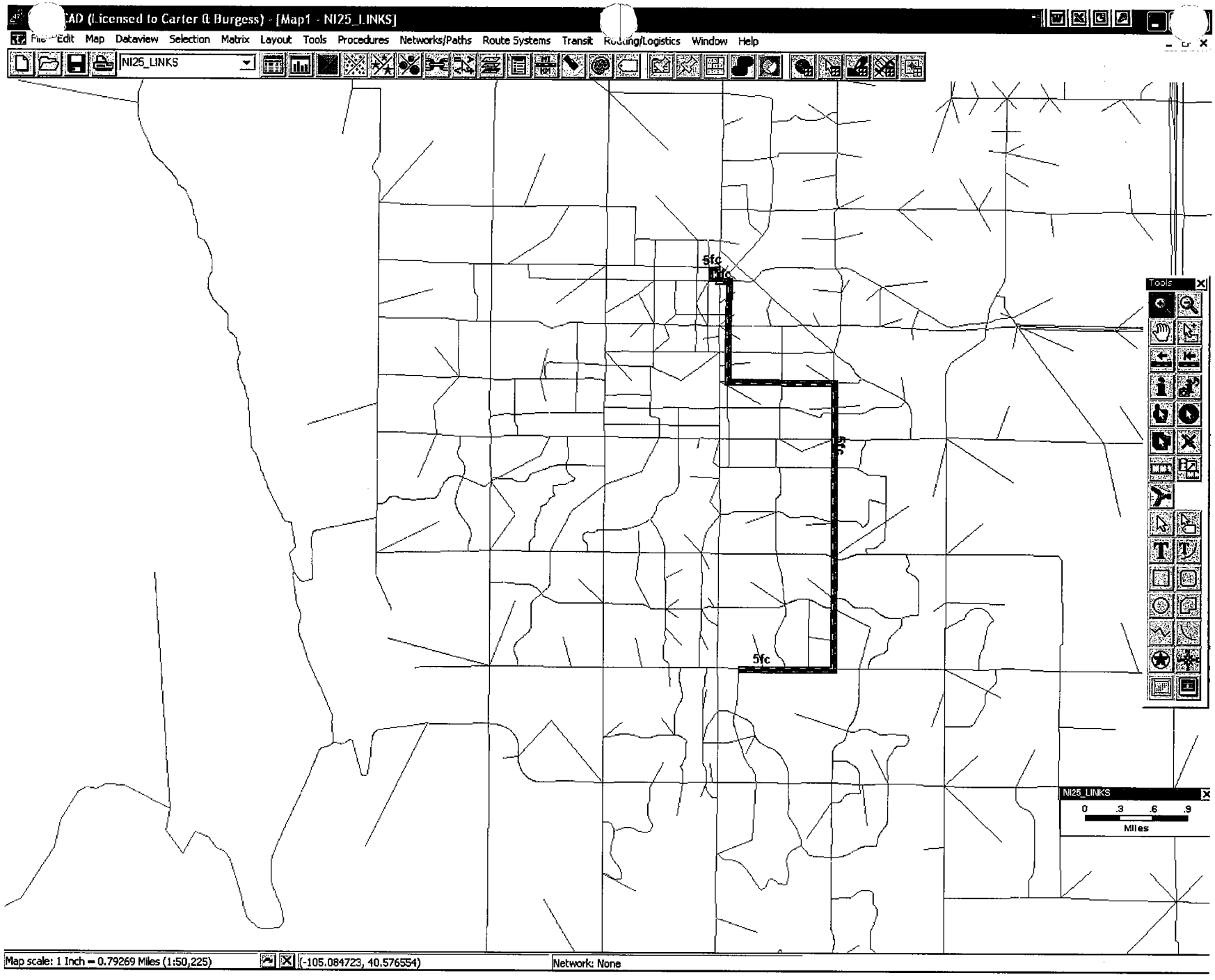
Network: None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NI25_LINKS
5fc
5fc
5fc
Tools
NI25_LINKS
0 .3 .6 .9
Miles
Map scale: 1 Inch = 0.79269 Miles (1:50,225)
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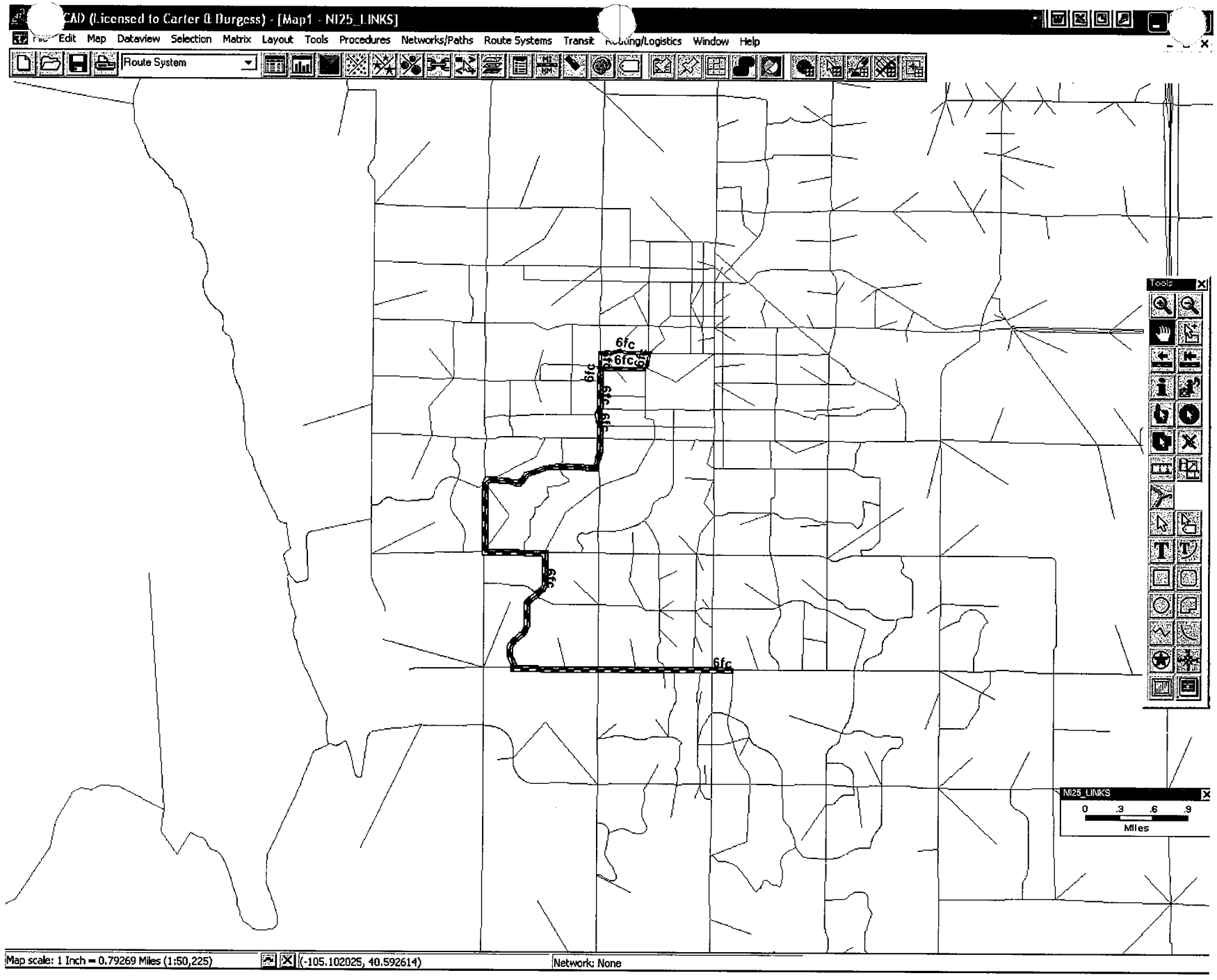
Network: None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Route System
6fc
6fc
6fc
6fc
6fc
6fc
6fc
6fc
Tools
NI25_LINKS
0 .3 .6 .9
Miles
Map scale: 1 Inch = 0.79269 Miles (1:50,225)
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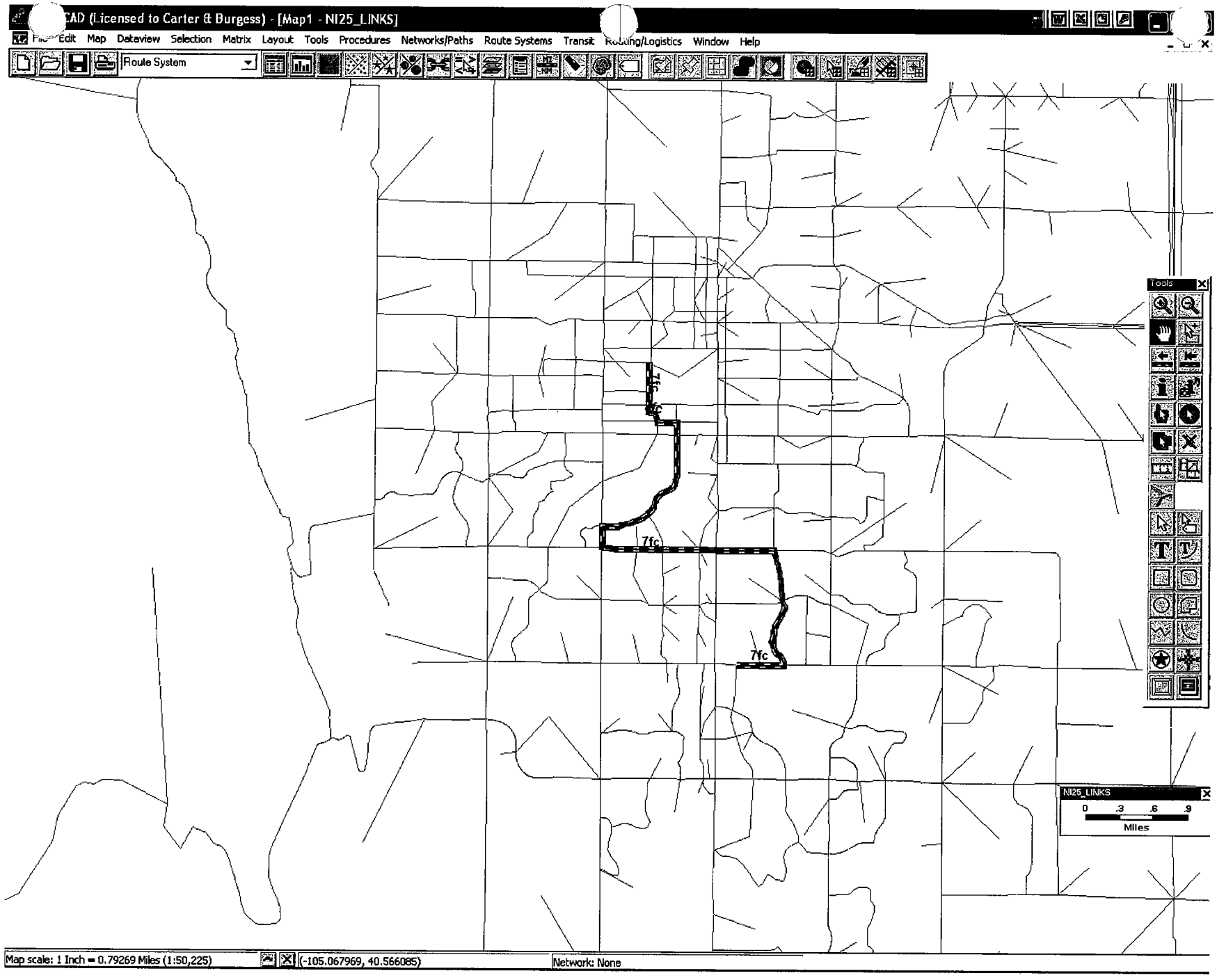
Network: None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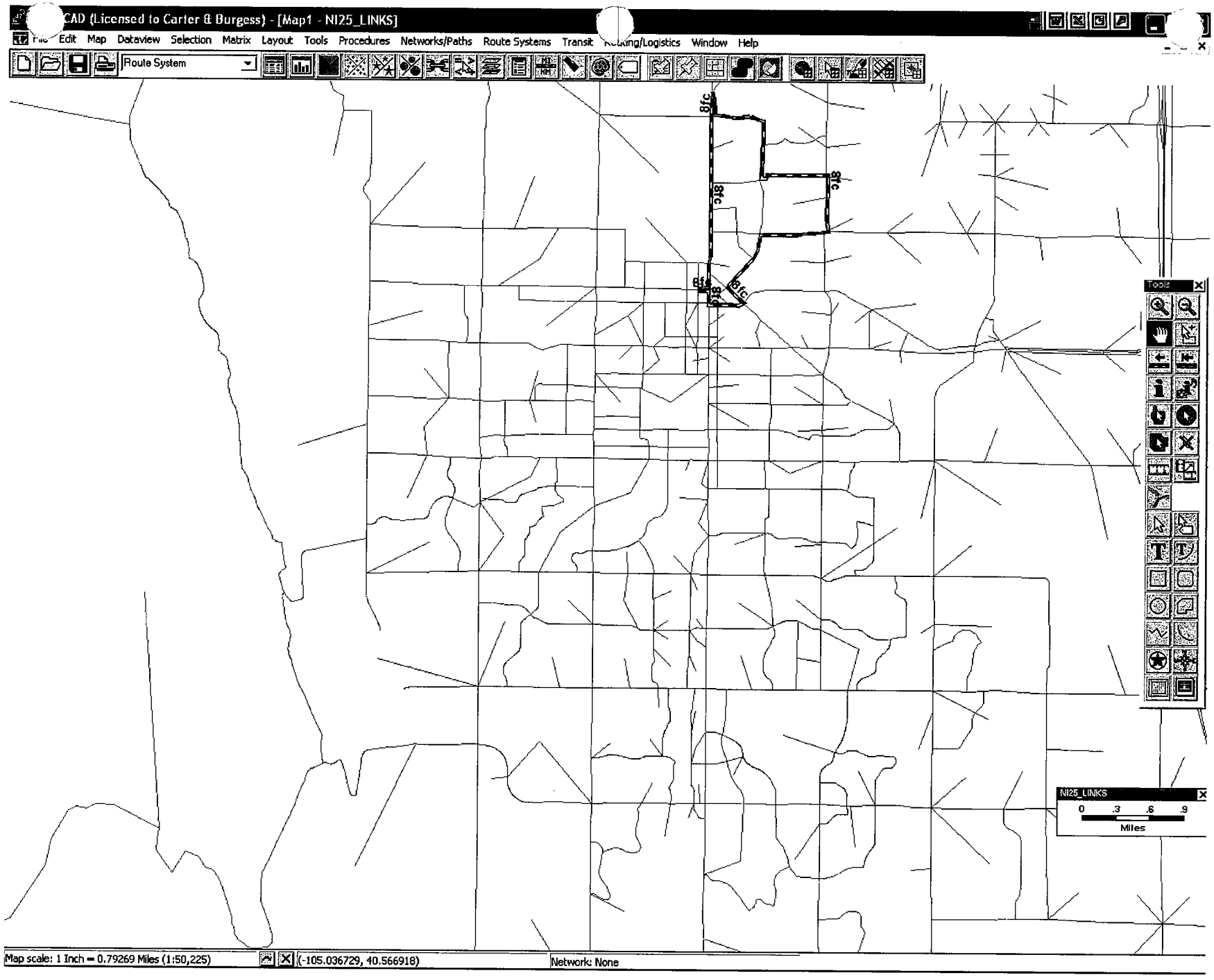
Route System
7fc
7fc
7fc
Tools
NI25_LINKS
0 .3 .6 .9
Miles
Map scale: 1 Inch = 0.79269 Miles (1:50,225)
(-105.067969, 40.566085)
Network: None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Route System
Tools
NI25_LINKS
0 .3 .6 .9
Miles
Map scale: 1 Inch = 0.79269 Miles (1:50,225)
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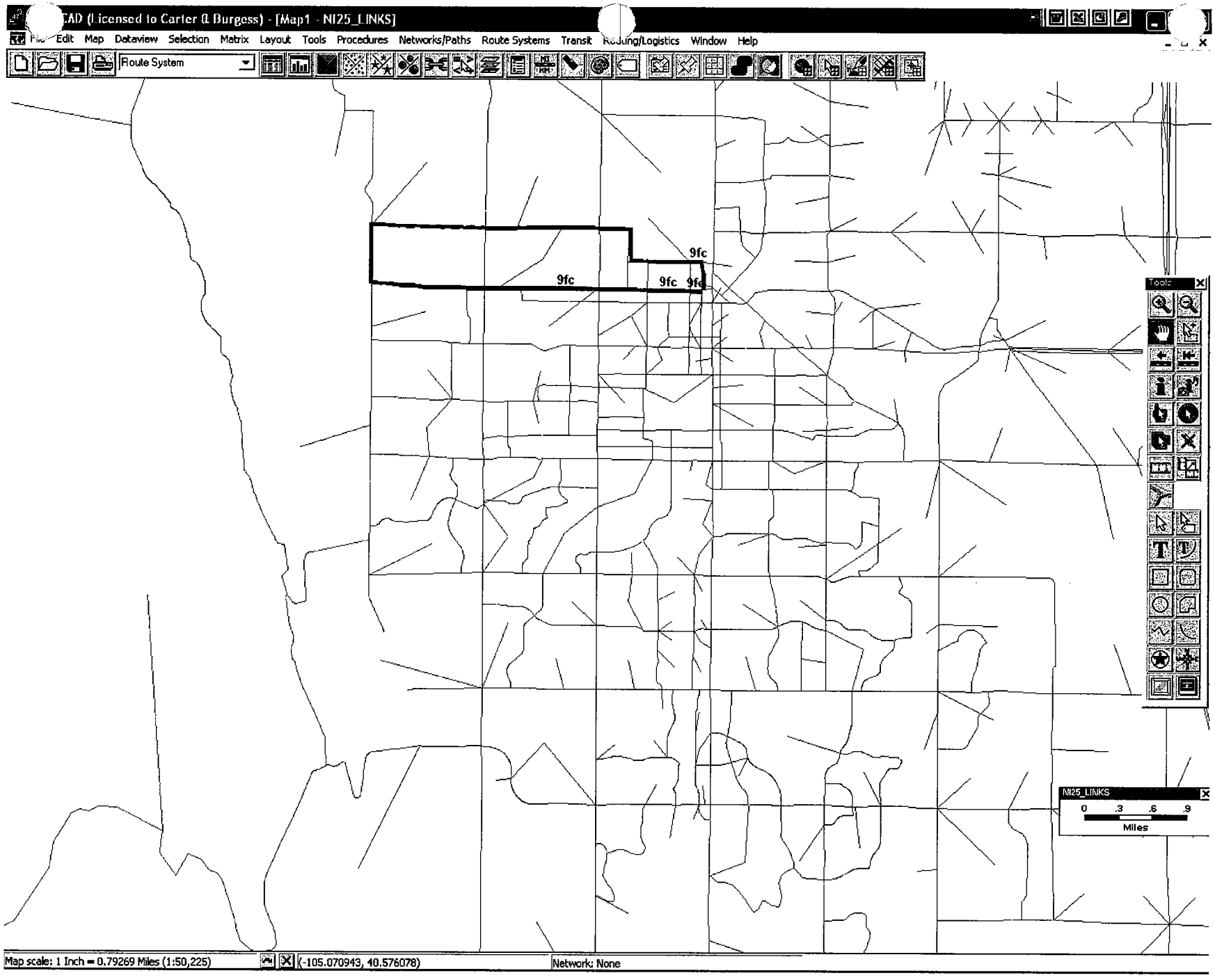
Network: None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Route System
9fc
9fc
9fc
9fc
Tools
NI25_LINKS
0 .3 .6 .9
Miles
Map scale: 1 Inch = 0.79269 Miles (1:50,225)
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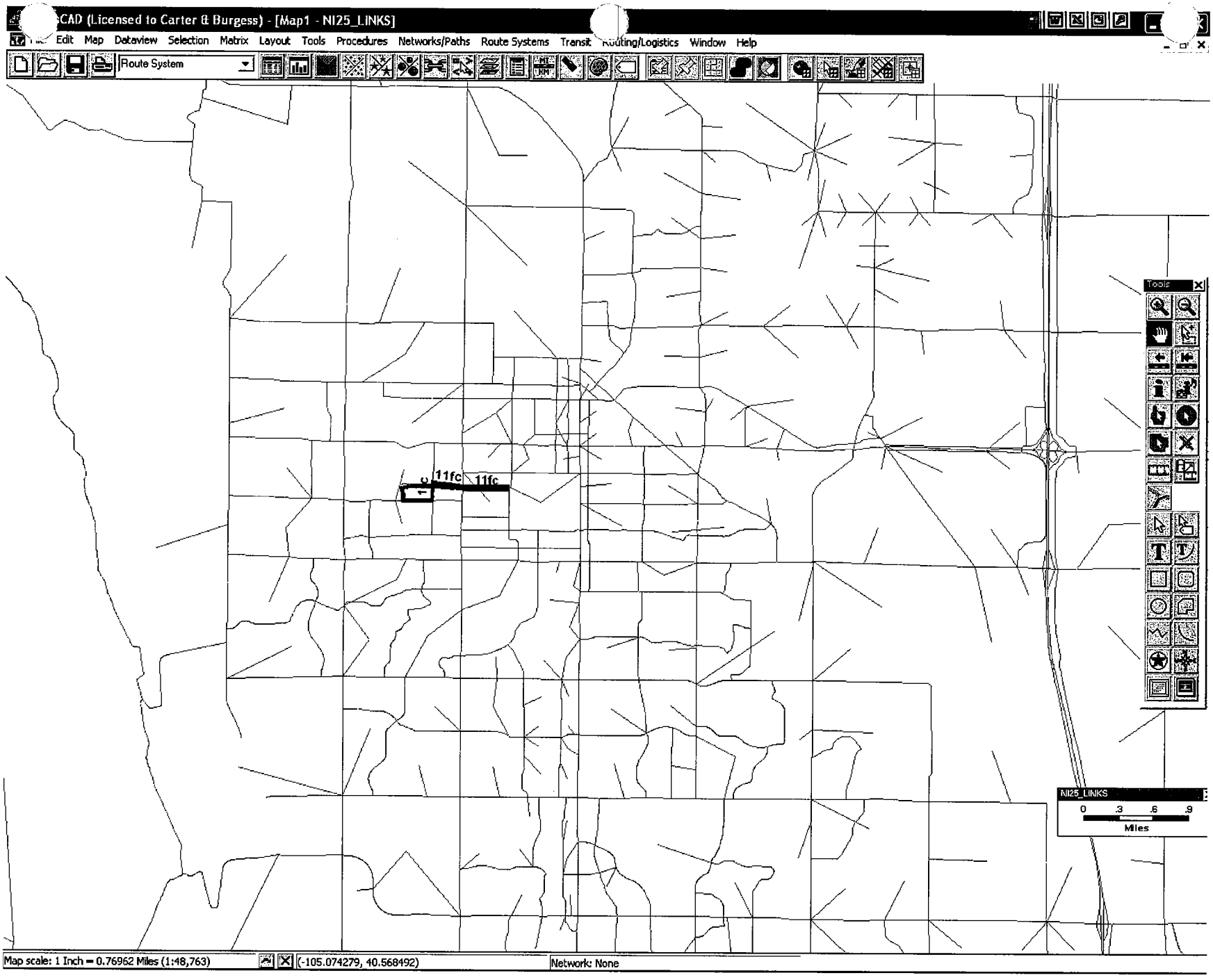
Network: None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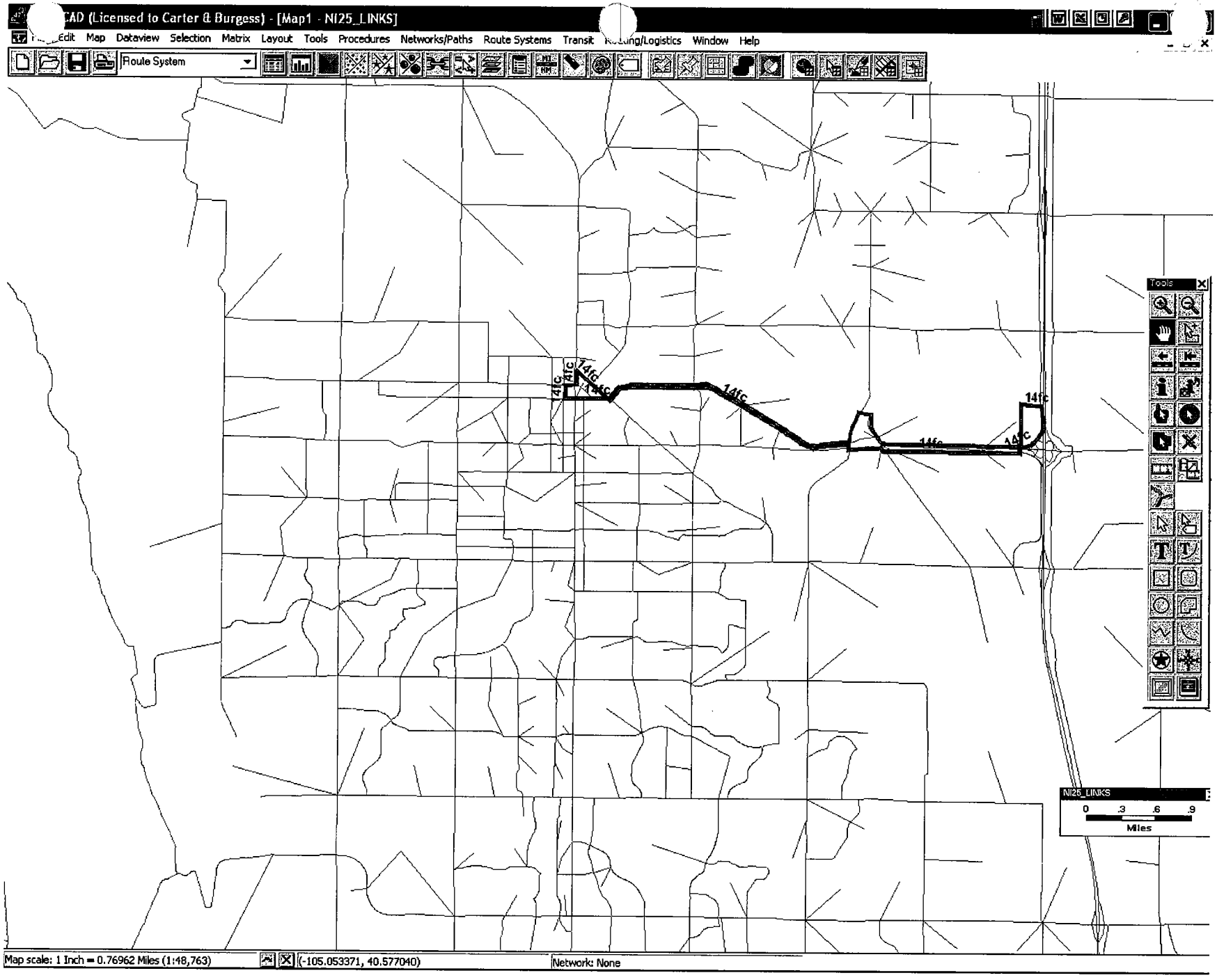
Route System
11fc
11fc
Tools
NI25_LINKS
0 .3 .6 .9
Miles
Map scale: 1 Inch = 0.76962 Miles (1:48,763)
(-105.074279, 40.568492)
Network: None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Route System
14fc
Tools
NI25_LINKS
0 .3 .6 .9
Miles
Map scale: 1 Inch = 0.76962 Miles (1:48,763)
(-105.053371, 40.577040)
Network: None

Greeley the BUS Route Changes between 2001 and 2004
Source: November 1, 1999 the Bus Reader's Guide

Route	Routing Change to 2001 from 2004	Degree of Routing Change	2001 Peak Hdwy*	2004 Peak Hdwy*	2001 Off-Peak Hdwy*	2004 Off-Peak Hdwy*
	Jog added at eastern end and eliminated at Bittersweet Plaza.					
1	Route starts and ends on west side at Aims Community College.	Minor	60	60	60	60
2	Major restructuring of route with route endpoints at Bittersweet Plaza and Hillside Center.	Major	60	60	60	60
3	Major restructuring of route with route endpoints at Greeley Mall and the north end of town.	Major	60	60	60	60
4	Major restructuring of route with endpoints at Walmart in the south and Monfort in the north.	Major	60	60	60	60
5	Major restructuring of route with endpoints at Aims College and Greeley Mall.	Major	60	30	60	30
6	Combined with route 5 in 2001.	Major	60	60	60	60
7	New route going from Evans in the south to O St. in the north.	Major	60	NA	60	NA
8	New route going from downtown to Garden City to East Memorial Elementary School.	Major	60	NA	60	NA
9	New route serving school trips with only one trip in the morning and one trip in the afternoon.	NA	NA	NA	NA	NA
Boomerang	Did not exist in 2001.	NA	NA	20	NA	20

*Headway applies to both directions on the route if applicable. Some routes operate in only one direction.