

Dallas District Four Year Safety Plan

Minh Le, P.E., PMP
TTI Dallas

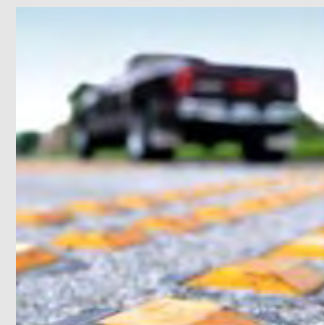


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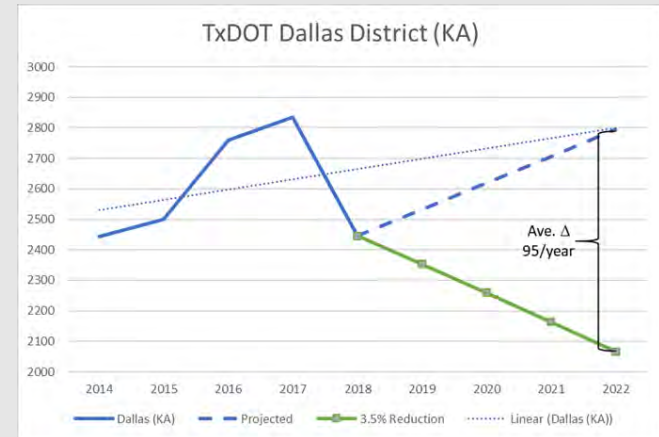


- Dallas District has lowest avg. fatal crash rate (2015-2017) because of high VMT
- It still has 13,000 KA crashes (2k fatal, 11k incapacitated)
 - 2,600 KA crashes/year
 - 7.1 KA crashes/day
- Not acceptable

- Dallas District Target
 - crashes projected 4 years (blue dash line)
 - 3.5% reduction per TRF's guidelines (green line)
 - Delta is 95 crashes per year

KA Crashes—On and Off System (2014–2018)

Year	Fatal (K)	Incapacitated (A)	Total
2014	360	2,085	2,445
2015	366	2,133	2,499
2016	436	2,324	2,760
2017	449	2,385	2,834
2018	421	2,025	2,446
Total	2,032	10,952	12,984





- Modeled after TxDOT's Strategic Highway Safety Plan (SHSP)
- Focused on 4 emphasis areas: Roadway Departure, Intersections, Pedestrians, and Wrong-Way Driving
- Developed HSIP projects by two approaches
 - Reactive (location specific or targeted) - projects based on historic crash data utilizing proven countermeasures and other options.
 - Proactive (systemic) - projects utilizing appropriate systemic proven countermeasures

KA Crashes by Emphasis area (2014-2018) – On & Off System

Emphasis Area (EA)	Roadway Departure	Intersection	Pedestrian	Wrong Way*	Total	% of Total
Fatal (K)	796	477	438	79	1790	18%
Incapacitated (A)	2715	4438	1062	162	8377	82%
Total	3511	4915	1500	241	10167	
% of Total	35%	48%	15%	2%		

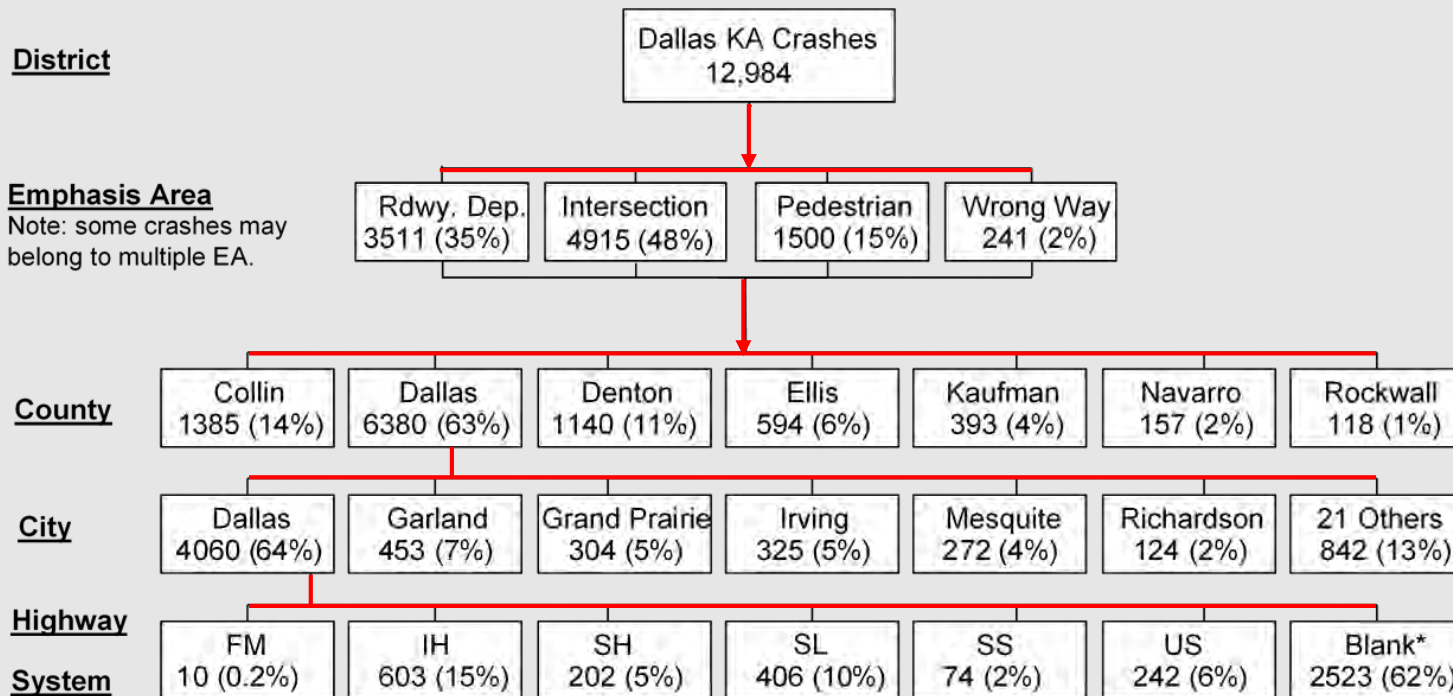
* Later revised to only controlled-access facilities and contributing factor =71, all crash severities



District

Emphasis Area

Note: some crashes may belong to multiple EA.

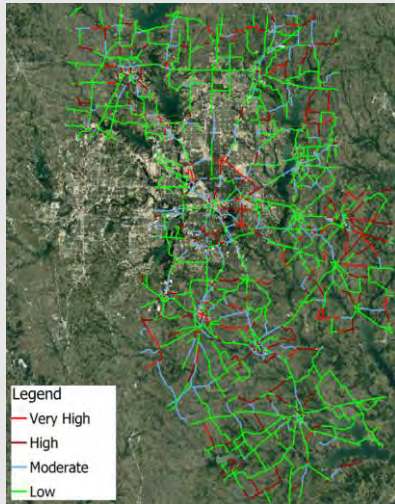


*Generally Off System

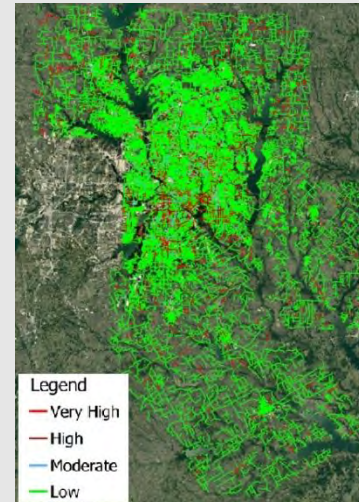


Reactive Screening Analysis (EA1-EA3)

- Dallas District Crash Risk Classifications
- Safety performance function developed to estimate the long-term crash frequency of roadway segments using RHINO segmentation and ADT



On-System Crash Risk
Classifications

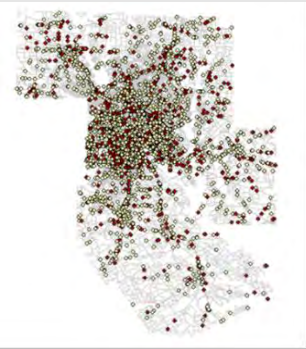


Off-System Crash Risk
Classifications

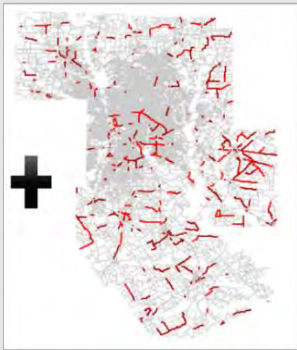


Reactive Screening Analysis (EA1-EA3)

- Roadway Departure (EA1) High-Risk Base Segments Example
 - combined the highest-risk locations with an observed severe crash history (left figure)
 - initially resulted in 509 high-risk base segments
 - KA threshold increased to ≥ 4 resulting in top 48 base segments (right figure)



EA1: Roadway Departure Crashes (KA)



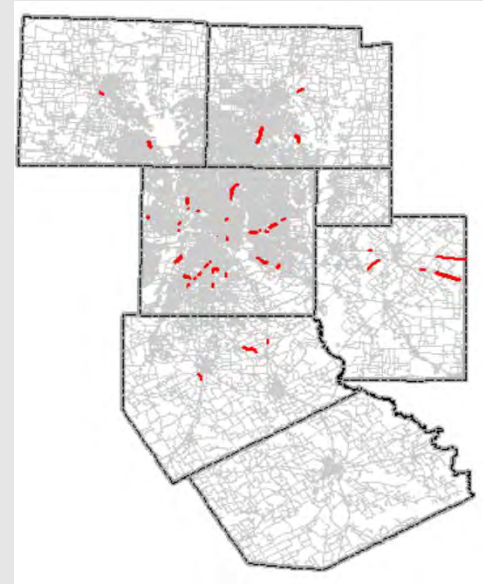
High and Very High Risk Road Segments



Spatial-Joint



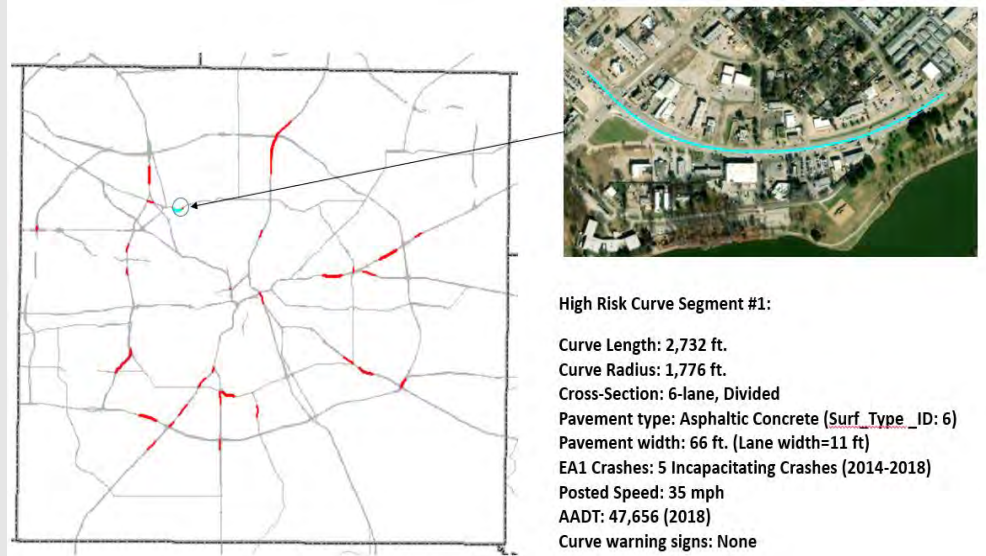
EA1 High and Very High Risk Road Segments
509 in total (KA ≥ 1)





Reactive Screening Analysis (EA1-EA3)

- Roadway Departure (EA1) High-Risk Curve Base Segments
 - Proposed 6" edgeline pavement markings for non-freeway base segments on curves
 - Proposed HFST on curves with ≥ 1 wet-weather KA crash and $SKID \leq 20$

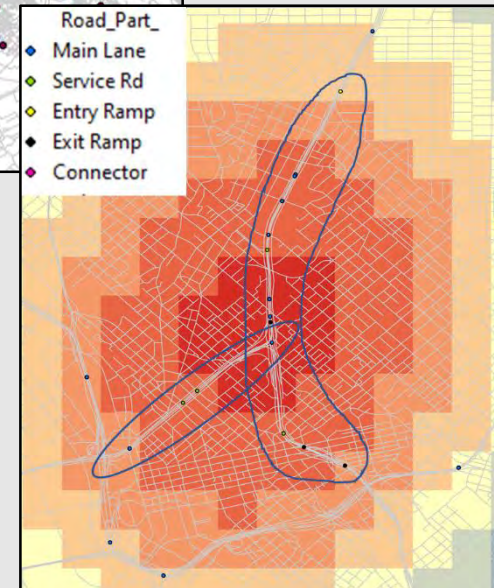
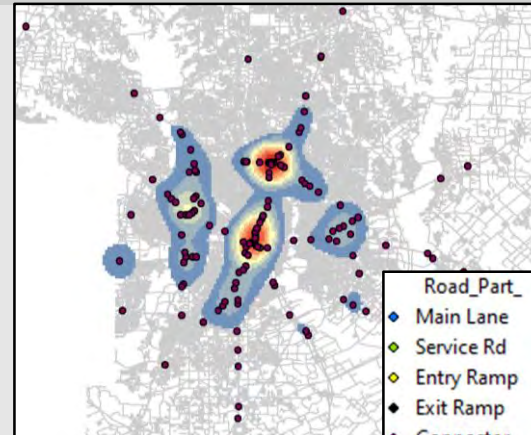


Methodology



Reactive Screening Analysis (EA4)

- 2014-2018 WWD Crashes on Controlled Access Facilities
 - 171 KABCO crashes
 - 132 (77%) 0-6am, 8pm-midnight

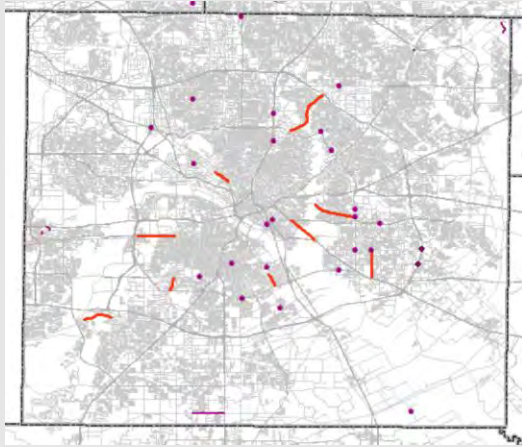


Crash Severity	Frequency	Percent
Fatal (K)	18	11%
Incapacitated (A)	19	11%
Non-incapacitated (B)	35	20%
Possible Injury (C)	23	14%
No Injury/PDO (O)	74	43%
Unknown	2	1%

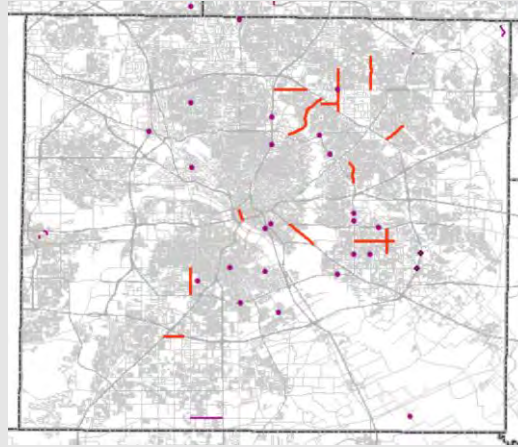


Additional screening analysis for off-system (EA1-EA3)

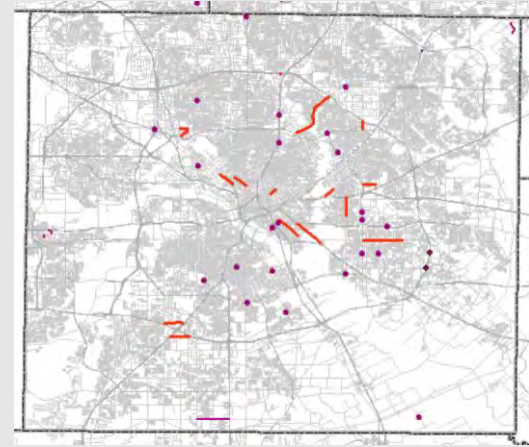
- Dallas District Crash Risk Classifications
- KA threshold increased between 5 and 10 to yield top base segments (red lines)
- Reviewed >90 past off-system HSIP projects not awarded and have not been built (purple lines or dots)
- Noted past off-system HSIP projects that overlapped high-risk base segments



EA1 (KA>=5) - 9 Segments



EA2 (KA>=10) - 14 Segments



EA3 (KA>=5) - 17 Segments

HSIP Results – Off-System by County



County	FY21	FY22	FY23	FY23-24	Total	% Projects by FY
Collin				43	43	46.7%
Dallas		5		28	33	35.9%
Denton				5	5	5.4%
Ellis				1	1	1.1%
Kaufman				5	5	5.4%
Rockwall				4	4	4.3%
DEN, COL				1	1	1.1%
Total	-	5	-	87	92	100%

Methodology

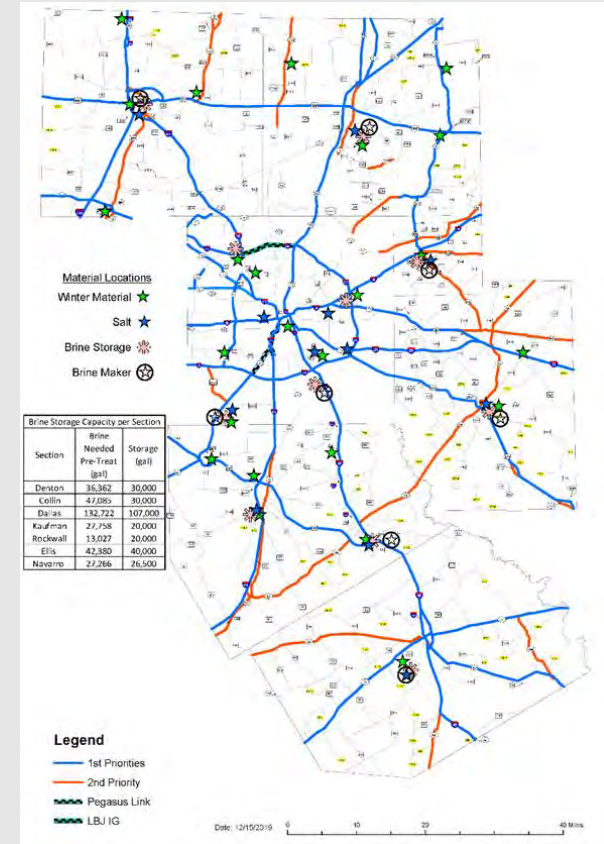


Proactive Screening Analysis (EA1-EA3)

- Dallas District responsible for 2,300 centerline miles and 7,774 lane miles of on-system roadways

On-System Miles	Centerline	Lane	DVMT	Truck DVMT
Collin	391	1,196	8,119,997	509,697
Dallas	790	3,304	39,129,226	3,264,114
Denton	382	1,312	9,579,305	960,234
Ellis	325	863	4,155,909	728,861
Kaufman	186	501	2,141,481	261,279
Navarro	122	330	996,399	192,174
Rockwall	104	268	1,787,380	197,895
Total	2,300	7,774	65,909,697	6,114,254

- Can not afford to apply systemic countermeasures to all these roadways
- Focus on priority routes in Dallas Winter Storm Plan (Tier 1 & 2)
 - higher-functioning and higher-volume roadways
 - Tier 1: 775 centerline miles
 - Tier 2: 297 centerline miles





- Project Development - HSIP projects developed for EA base segments and Tier 1 & 2 roadways including
 - Project limits, Scope, and Cost Estimate
- Checked projects for potential overlap/redundancies with
 - Existing and planned improvements in FY20–24 projects in TxDOTCONNECT
 - Recently proposed RTZ projects
 - Between EA base segments and Tier 1 and 2 systemic segments
- Project Priorities based on a combination of factors such as:
 - Project readiness
 - Tier 1 or Tier 2 roadways
 - On or off system
 - Current programmed year in TxDOTCONNECT

Selected Countermeasures



No.	Countermeasure	CMF
EA1: Roadway Departure		
1	Centerline Rumble Stripes/Strips	0.74
2	Edgeline Rumble Stripes/Strips	0.85
3	Profile Centerline Markings	0.93
4	Profile Edgeline Markings	0.93
5	Enhanced Curve Warning System	0.65
6	Wide Edgeline Pavement Markings, 6"	0.78
7	High Friction Surface Treatment, Horizontal Curves	0.55
8	Shoulder Widening	0.69
9	Install Median Barrier	0.25
10	Add Roadside Barrier—e.g., metal beam guard fence and/or end treatment	0.84
11	Improve Barrier—compliant with Manual for Assessing Safety Hardware (MASH)	0.67
EA2: Intersection Safety		
1	Install Flashing Beacons at Intersection Approaches	0.86
2	Change from Permissive with Circular Green Symbol to Flashing Yellow Arrow Signals and Supplemental Traffic Signs	0.59
3	Install Left-Turn Lane	0.75

No.	Countermeasure	CMF
EA3: Pedestrian Safety		
1	Install Pedestrian Countdown Timer	0.65
2	Install Pedestrian Hybrid Beacon (PHB or HAWK) with Advanced Yield or Stop Markings and Signs	0.43
3	Install Pedestrian Crosswalk	0.9
4	Install High-Visibility Crosswalk	0.78
EA4: Wrong-Way Driving		
1	Reflective Tape Signpost	NA
2	WW Raised Pavement Marking Arrow	NA
3	WW/DNE Sign	NA
4	WW LED Sign	NA
5	WWD Alert System	NA

Note: The crash modification factor (CMF) is a multiplicative factor used to compute the expected number of crashes after implementing a given countermeasure at a specific site. The lower the CMF, the more effective the countermeasure is compared to base conditions, as described in the *Highway Safety Manual*.



Two project lists based on funding categories (Appendix D):

HSIP

RTZ

Unfunded RTZ projects, as well as selected maintenance projects that met a safety need, were added to the potential HSIP project list

251 potential HSIP projects, totaling over \$1.3 billion*

10 RTZ projects, totaling about \$17 million* (already approved and funded)

**updated 5/22/20*



Approach	Projects	% Projects	Cost \$	% Cost
Targeted	160	64%	581,433,359	44%
Systemic	91	36%	727,995,424	56%
Total	251	100%	1,309,428,783	100%

FY	EA1: Rdwy. Dep.	EA2: Intersection	EA3: Pedestrian	EA4: WWD	Total	Projects by FY
21	93	3	4	2	102	41%
22	32	14	1	2	49	20%
23	11	2			13	5%
23-24	22	65			87	35%
Total	158	84	5	4	251	100%

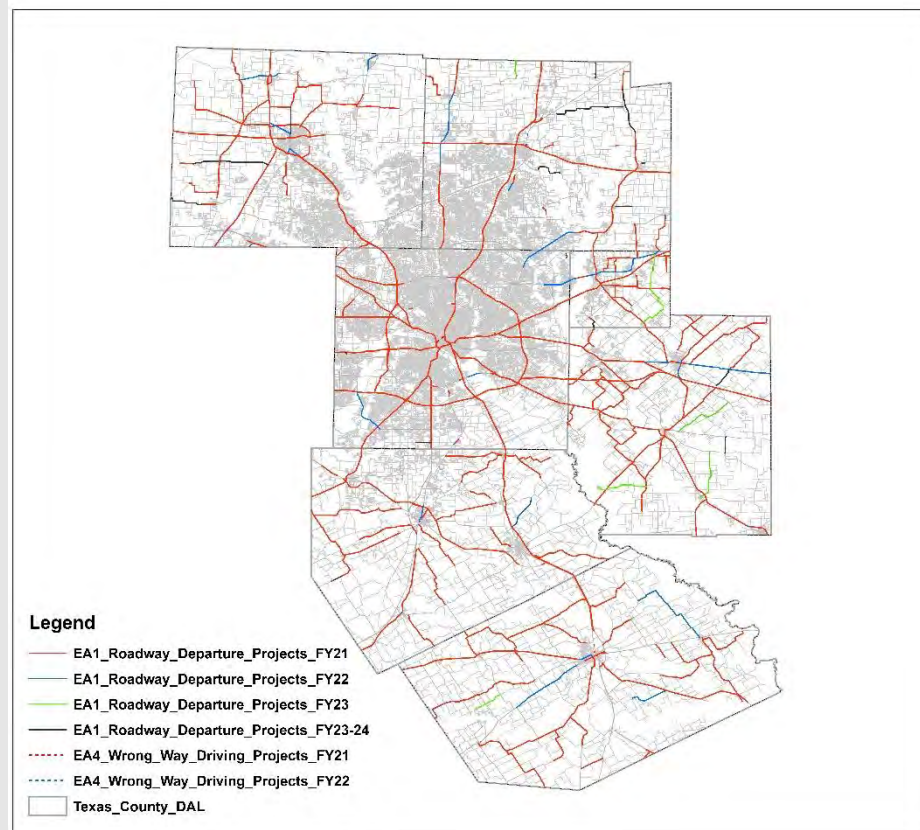
FY	EA1: Rdwy. Dep.	EA2: Intersection	EA3: Pedestrian	EA4: WWD	Total	Projects by FY
21	\$844,573,630	\$2,210,859	\$6,659,763	\$82,410	\$853,526,662	65%
22	\$238,480,397	\$16,964,903	\$7,796,280	\$450,000	\$263,691,580	20%
23	\$107,380,715	\$18,311,968			\$125,692,683	10%
23-24	\$48,204,005	\$18,313,853			\$66,517,858	5%
Total \$	\$1,238,638,747	\$55,801,583	\$14,456,043	\$532,410	\$1,309,428,783	100%

HSIP Results – On-System by County

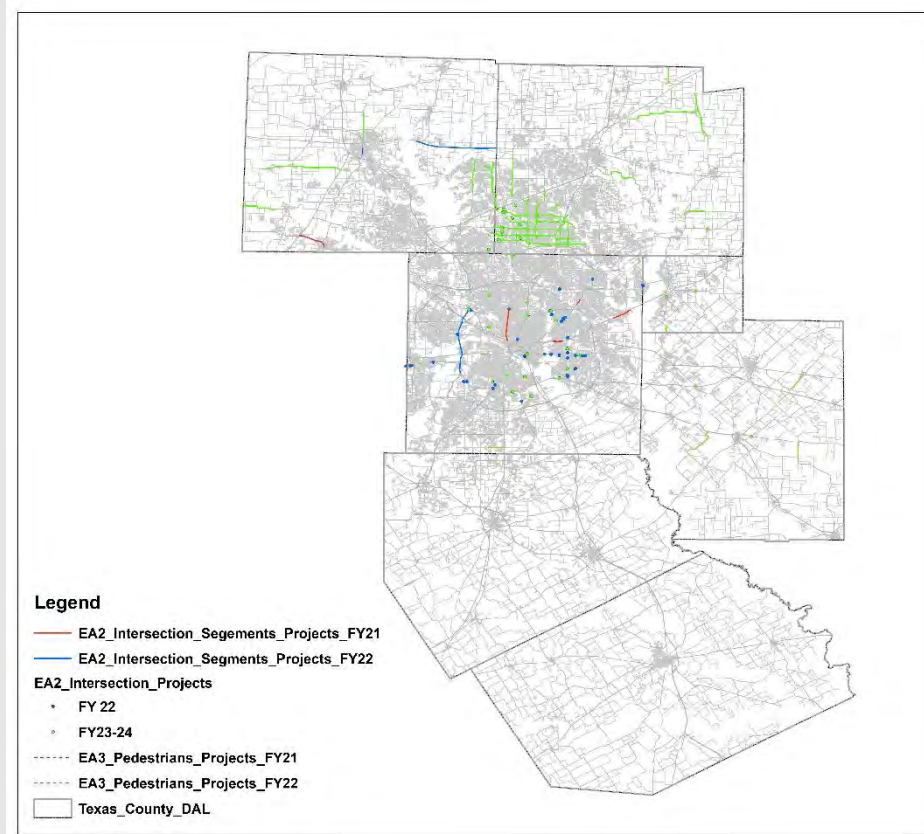


County	FY21	FY22	FY23	FY23-24	Total	% Projects by FY
All	1				1	0.6%
Collin	8	6	1		15	9.4%
DAL, COL, DEN, KAU, ELL	1				1	0.6%
DAL, COL, KAU, ELL	1				1	0.6%
Dallas	49	16			65	40.9%
Denton	19	8	1		28	17.6%
Ellis	8	2	1		11	6.9%
Kaufman	9	4	6		19	11.9%
Navarro	2	5	3		10	6.3%
Rockwall	4	3	1		8	5.0%
Total	102	44	13	-	159	100%

HSIP Results – EA 1 & EA 4 HSIP Map



HSIP Results – EA 2 & EA 3 HSIP Map

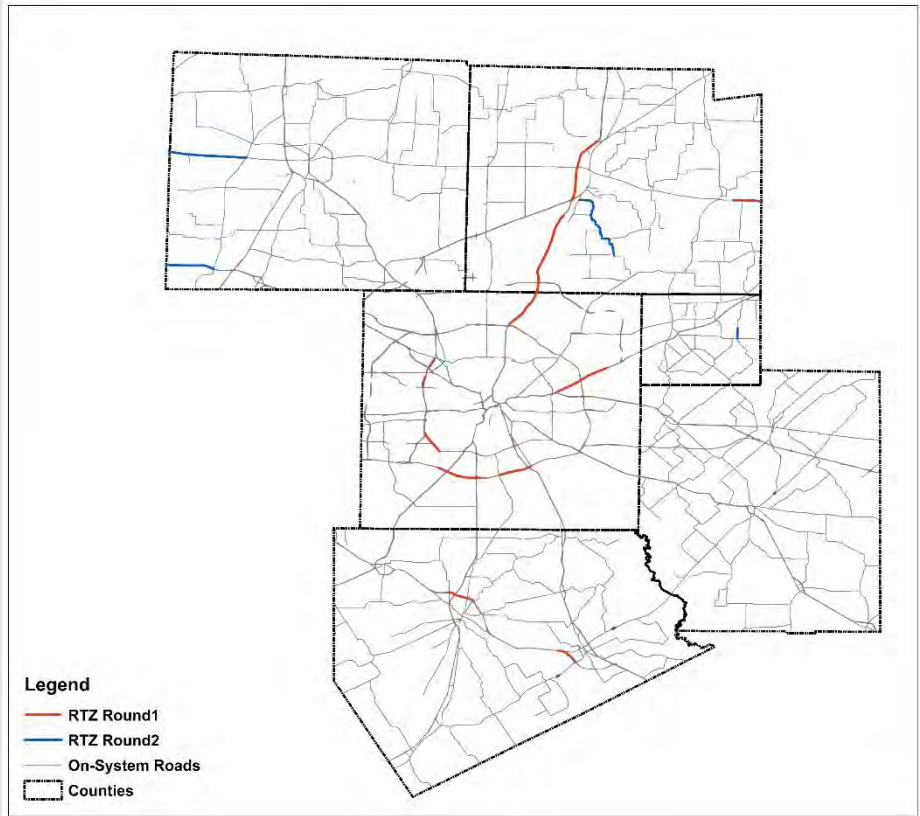


Additional Efforts



▪ Road To Zero Projects

Project Scope	Emphasis Area
Install glare screens	Peds.
Install cable barrier	Rdwy. Dep.
Add rumble strips and profile pavement markings	Rdwy. Dep.
Add Sidewalks	Peds.
Add left turn lane	Intersection
Install Profile Markings	Rdwy. Dep.
Intersection Improvements (Turn Lanes)	Intersection
Median Barrier	Rdwy. Dep.





QUESTIONS?