

**CITY OF HOUSTON BRIDGE  
DATABASE IMPROVEMENT PROCESS**

**PROJECT**

**LEAN SIX SIGMA GREEN BELT PRESENTATION**

**DATE : JULY 15, 2015**

# **BENEFITS OF AN ACCURATE AND RELIABLE BRIDGE DATABASE**

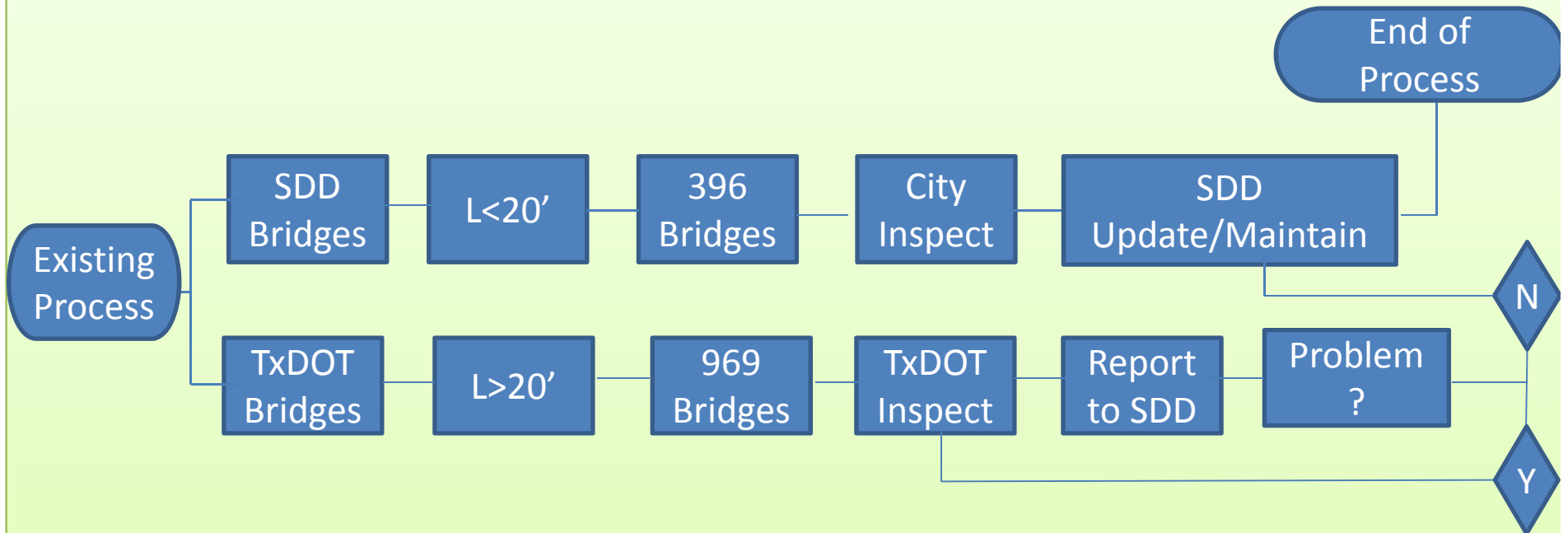
- SAVES TIME
- SAVES MONEY
- INCREASES PUBLIC SAFETY
- ACCELERATE RESPONSE TIME
- SATISFY THE NEEDS OF INTERNAL AND EXTERNAL CUSTOMERS
- REDUCES OR ELIMINATES CUSTOMERS COMPLAINTS
- ELIMINATES STATUS QUO, IDLE TIME, AND WASTED OPPORTUNITIES
- ACCELERATE PROJECT ACTIVITIES AND ASSIGNMENTS
- PROVIDES COH ASSET MANAGEMENT AND FINANCE DEPARTMENT WITH BETTER AND MORE ACCURATE BRIDGE INVENTORY
- IT HELP WITH STATE AND FEDERAL TRANSPORTATION ASSISTANCE PROGRAMS
- ADD VALUE TO THE COH BRIDGE ASSET INVENTORY

# DMAIC

- **DEFINE:** COH BRIDGE DIVISION DOES NOT HAVE AN ESTABLISHED AND APPROVED BRIDGE DATABASE ENTRY AND CONTROL PROCESS. EXISTING COH BRIDGE DATABASE CONTAIN VARIOUS DISCREPANCIES THAT NEED TO BE ADDRESSED, CORRECTED, CONTROLLED, AND MAINTAINED.
- **MEASURE:** IDENTIFY BRIDGE DATABASE DISCREPANCIES BY COLLECTING BRIDGE DATA, VERIFYING COLLECTED DATA, AND REPORTING THE RESULTS.
- **ANALYZE:** UTILIZE ROOT/CAUSE ANALYSIS, DETERMINE VARIABLES, ELIMINATE WASTES, AND ESTABLISH VALUES AND OPPORTUNITIES.
- **IMPROVE:** IMPROVE COH BRIDGE DATABASE ENTRY AND MAINTENANCE BY ESTABLISHING AN EFFECTIVE AND APPROVED GUIDELINE, BETTER COMMUNICATION METHOD, BETTER INFORMATION FLOW, AND CREATING A LINK TO ECD DEPARTMENTS.
- **CONTROL:** UPDATE AND SUSTAIN COH BRIDGE DATABASE BY STAYING INFORMED OF THE CURRENT AND FUTURE BRIDGE DATA CHANGES, ESTABLISHING AND IMPLEMENTING AN APPROVED GUIDELINE, EFFECTIVE COMMUNICATION, BETTER INFORMATION COLLECTION METHOD, AND TIMELY BRIDGE DATA ENTRY PROCESS.

# DEFINE PHASE: EXISTING PROCESS

## FLOW CHART OF EXISTING BRIDGE DATA ENTRY AND MAINTENANCE PROCESS



# **DEFINE PHASE: PROBLEM STATEMENT**

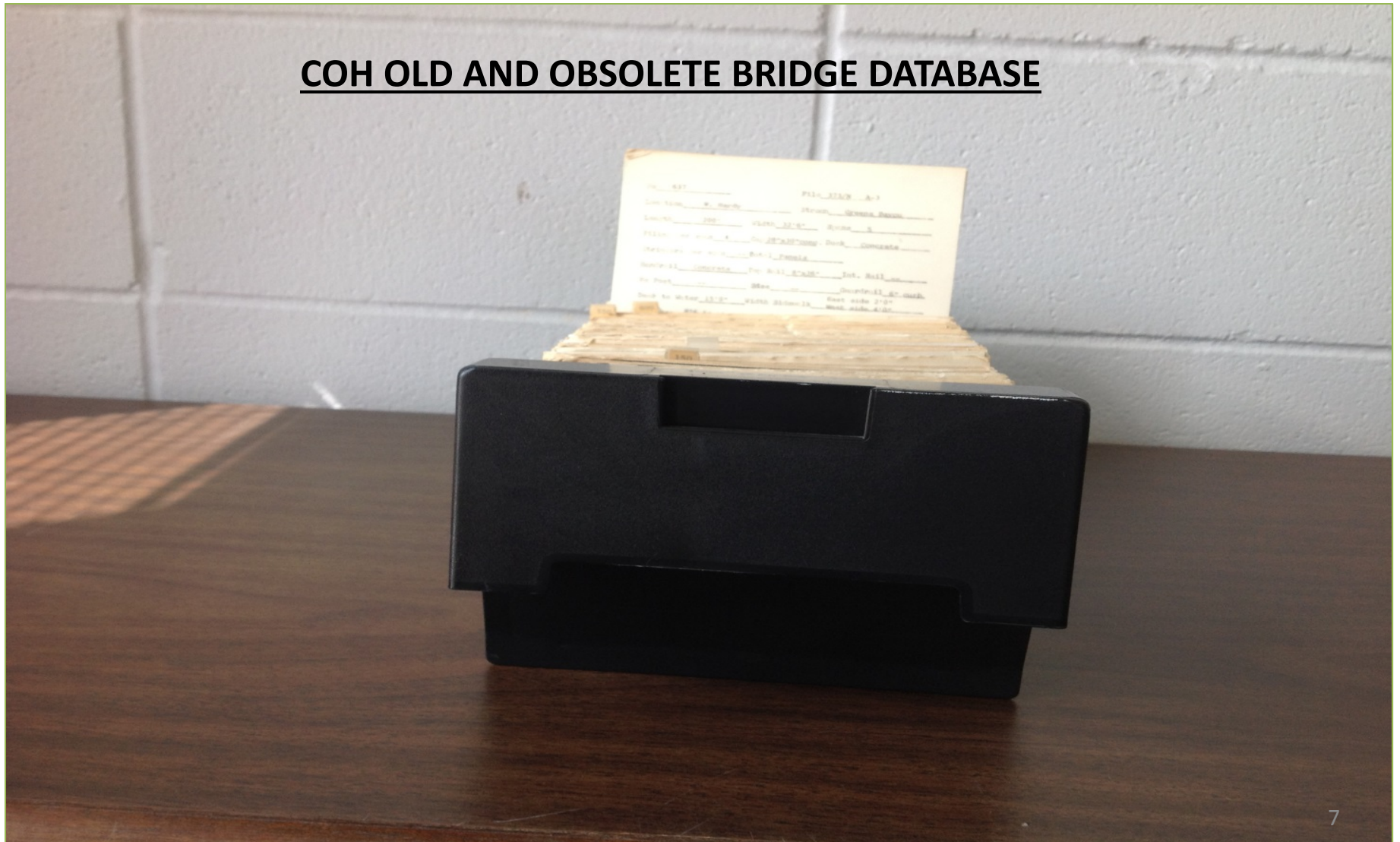
THE COH BRIDGE DATABASE CONTAINS VARIOUS DISCREPANCIES/ERRORS. THE KNOWN NUMBER OF DISCREPANCIES/ERRORS ARE APPROXIMATELY 774. EXISTING COH BRIDGE DATABASE NEEDS TO BE REVIEWED AND ANALYZED FOR THESE KNOWN DISCREPANCIES/ERRORS. THROUGH AN EFFECTIVE COMMUNICATION WITH THE OTHER ENTITIES, THESE DISCREPANCIES/ERRORS WILL BE REDUCED OR ELIMINATED WITHIN THE NEXT THREE MONTHS (4/15/2015 TO 07/15/2015). THIS WILL ESTABLISH A MORE CURRENT AND ACCURATE BRIDGE DATABASE TO BUILD ON, CONTROL, AND SUSTAIN.

## **DEFINE PHASE: MISSION STATEMENT**

REVIEW, DETECT, AND REDUCE OR ELIMINATE EXISTING COH BRIDGE DATABASE DISCREPANCIES/ERRORS BY JULY 15, 2015. UPDATE AND MAINTAIN A MORE ACCURATE BRIDGE DATABASE BY ESTABLISHING AND USING AN APPROVED GUIDELINE, AN EFFECTIVE BRIDGE DATA COLLECTION METHOD, PROPER BRIDGE DATA ENTRY, EFFECTIVE COMMUNICATION METHOD, AND BETTER INFORMATION FLOW.

# MEASURE PHASE: DATA COLLECTION

## COH OLD AND OBSOLETE BRIDGE DATABASE



# MEASURE PHASE: DATA COLLECTION

## CURRENT COH BRIDGE SPREADSHEET

CO	TxDOT NUMBER	COH #	QUAD	MAP	FACILITY CARRIED OVER	FEATURE CROSSED	LOCATION	YEAR BUILT	LENGTH	WIDTH
102	B19129 001	1	NE	452H	600 DELZ	DRAINAGE DITCH	0.04 MI E OF SHEPHERD DR		213'	44' 0"
170	B40177 004 1	2	SE	494Q	600 LOCKWOOD DR	BUFFALO BAYOU	0.54 MI S OF CLINTON DR	1982	1214' 0"	86' 8"
170	B34713 149 1	3	SE	494J	400 SOUTH JENSEN DR	BUFFALO BAYOU	0.38 MI S OF IH 45	1938	500' 0"	54' 0"
170	B43593 001 1	4	SE	493M	700 MCKEE ST	BUFFALO BAYOU	0.35 MI S OF IH 10	1932	290' 0"	56' 8"
170	B57017 001 1	5	SE	493M	90 SAN JACINTO ST	BUFFALO BAYOU	AT C OMMERCE ST	1914 / 1996	325' 0"	70' 0"
102	B41401 003 1	6	SE	533F	2600 SOUTH MACGREGOR	BRAYS BAYOU	0.3 MI SE OF ALMEDA	2010	33' 0"	118' 0"
170	B44745 002 1	7	SE	493H	100 MILAM ST	BUFFALO BAYOU	0.15 MI S OF IH 10	1947	331' 0"	57' 6"
170	B25401 001 1	8	SE	493L	600 FRANKLIN ST	BUFFALO BAYOU	0.3 MI W OF MAIN ST	1914 / 1998	350' 0"	80' 0"
170	B59801 001 1	9	SE	493L	200 SMITH ST CONN	BUFFALO BAYOU	0.4 MI S OF IH 10	1962	262' 0"	49' 4"
170	B52425 241 1	10	SE	493L	400 PRESTON AVE	BUFFALO BAYOU	0.35 MI W OF MAIN ST	1998	205' 0"	62' 0"
170	B12209 001 1	11	SE	493L	200 CAPITOL AVE	BUFFALO BAYOU	0.51 MI NW OF MAIN ST	1996	380' 0"	33' 8"
170	B56401 669 1	12	SW	493K	200 SABINE ST	BUFFALO BAYOU	0.07 MI N OF ALLEN PKWY	1924	240' 0"	70' 5"
170	B67849 001 1	13	SW	492M	400 WAUGH DR NB	BUFFALO BAYOU	0.1 MI S OF MEMORIAL DR	1994	352' 0"	84' 0"
102	B67849 002 1	13	SW	492M	400 WAUGH DR SB	BUFFALO BAYOU	0.1 MI S OF MEMORIAL DR	"	"	"
102	B59009 002 1	14	SW	492M	800 SHEPHERD DR FR	BUFFALO BAYOU	1.2 MI S OF IH 10	1921	332' 0"	56' 0"
102	B60578 001 1	15	NE	573S	16380 SPENCER RD	HCPCD DITCH	0.1 MI SE OF BELLEVUE 8	1968	61' 0"	32' 0"
102	B25897 515 1	16	SE	576T	10200 FLUQUA ST WB	HCPCD DITCH	0.1 MI W OF BEAMER	1965	56' 0"	29' 6"
102	B63545 002 1	17	NW	493G	2300 HOUSTON AVE	WHITE OAK BAYOU/DR	0 MI OVER IH 10			
102	B63545 001 1	18	NW	493F	2200 TAYLOR ST SB	WHITE OAK BAYOU/DR	0.01 MI N OF IH 10	1963	645' 0"	31' 6"
102	B31161 977 1	19	NW	493F	2200 TAYLOR ST NB	WHITE OAK BAYOU/DR	0.01 MI N OF IH 10	1963	679' 0"	31' 6"
102	B31161 078 1	20	NW	493E	200 HEIGHTS BLVD NB	WHITE OAK BAYOU	0.1 MI S OF IH 10	1937	240' 0"	38' 8"
102	B71457 079 1	21	NW	492H	200 YALE ST	WHITE OAK BAYOU	0.1 MI S OF IH 10	1931	264' 0"	55' 0"
102	B58977 002 1	22	NW	492D	500 NORTH SHEPHERD	WHITE OAK BAYOU	0.2 MI N OF IH 10	1929 / 1996	179' 0"	56' 3"
102	B00114 206 1	23	NW	452Y	2000 W 11TH ST	WHITE OAK BAYOU	0.1 MI W OF TC JESTER	1955	195' 0"	53' 3"
102	B41697 001 1	24	NE	493C	2700 N MAIN ST	LITTLE WHITE OAK BAYOU	0.5 MI SE OF IH 45	1995	163' 0"	58' 0"
102	B65209 060 1	25	NE	453Y	100 COTTAGE (TRIMBLE)	LITTLE WHITE OAK BAYOU	0.1 MI S OF SEARLE	1989	216' 0"	41' 0"
102	B22017 038 1	26	NW	452T	1600 ELLA BLVD NB	WHITE OAK BAYOU	0.1 MI N OF W 18TH	1958	203' 0"	28' 5"
102	B39673 085 1	27	NW	453T	400 LINK ST	LITTLE WHITEOAK BAYOU	0.08 MI W OF IH45	1960	153' 3"	40' 0"
102	B30433 565 1	28	SE	495X	1700 BRYAIDWAY BLVD	BRAYS BAYOU	1.7 MI N OF IH 610E	1962	508' 0"	66' 0"
102	B01201 222 1	29	SE	495W	400 75TH ST	BRAYS BAYOU	0.6 MI S OF HARRISBURG	1960	236' 0"	63' 0"
102	B25009 227 1	30	SE	494Z	400 FOREST HILL	BRAYS BAYOU	0.5 MI S OF HARRISBURG	1958	237' 0"	33' 0"
102	B38473 002 1	31	SE	494D	6800 LAWINDALE ST	BRAYS BAYOU	0.4 MI SE OF WAYSIDE DR	1958	230' 0"	74' 0"
102	B63697 552 1	32	SE	534G	3500 TELEPHONE RD	BRAYS BAYOU	0.1 MI NW OF WHEELER DR	1931	210' 0"	53' 3"
102	B69513 005 1	33	SW	529G	6700 WILCREST DR. (NB)	BRAYS BAYOU	0.1 MI N OF BELLAIRE BLVD.	1984	180' 0"	33' 5"
102	B69041 687 1	34	NW	534F	6700 WHEELER RD	BRAYS BAYOU	0.15 MI NW OF US 90A	1960	297' 0"	30' 5"
102	B11625 561 1	35	SE	534E	5000 CALHOUN ST	BRAYS BAYOU	0.4 MI N OF US 90A	1930	266' 0"	54' 0"
102	B57857 001 1	36	SE	533H	5400 SCOTT ST	BRAYS BAYOU	0.6 MI N OF US 90A	1984	289' 0"	75' 8"
102	B63249 061 1	37	SW	490T	3200 TANGLEWILDE ST.	HCPCD DITCH	0.1 MI S OF RICHMOND	1960	34' 5"	35' 0"
102	B02601 001 1	38	SW	533F	6100 ALMEDA RD	BRAYS BAYOU	AT MCGREGOR WAY	1931	149' 0"	55' 0"
102	B41689 056 1	39	SW	532M	7500 FANNIN SB	BRAYS BAYOU	0.05 MI N OF S. BREASWOOD	1963	202' 0"	43' 6"
102	B35361 553 1	40	SW	532L	7500 S MAIN ST	BRAYS BAYOU	AT BREASWOOD	1954	242' 0"	79' 0"
102	B60157 037 1	41	SE	534S	7400 JUTLAND RD	HCPCD DITCH	0.1 MI S OF PERSHING ST	1995	38' 9"	34' 9"
102	B69513 006 1	42	SE	534S	7400 SAINT LO RD	HCPCD DITCH	0.3 MI SW OF MLK BLVD	1998	29' 0"	50' 0"
102	B33025 038 1	43	SW	529G	6700 WILCREST DR. (SB)	BRAYS BAYOU	0.1 MI N OF BELLAIRE BLVD	1984	180' 0"	33' 5"
102	B62681 544 1	44	SE	494X	600 HUGHES ST	SLAUGHTER PEN BAYOU	0.2 MI NE OF POLK	1929	102' 0"	45' 7"
102	B62937 043 1	45	SE	534Z	7000 SWALLOW ST	SIMS BAYOU	0.9 MI SE OF BELLFORT	1998	360' 0"	42' 2"
102	B62209 007 1	46	NW	452Y	900 W TC JESTER EB	WHITE OAK BAYOU	0.15 MI N OF W 11TH ST	1960	306' 0"	35' 3"
102	B69121 211 1	47	SW	533E	1800 HOLCOMBE BLVD	BRAYS BAYOU	0.7 MI E OF FANNIN ST	1958	201' 0"	76' 0"
102	B22385 144 1	48	NE	494K	3700 MILK BLVD NB	SIMS BAYOU	0.1 MI E OF BROADWAY	2005	34' 0"	20' 5"
102	B71209 154 1	49	NE	494K	100 EMILE ST	JAPHET CREEK	0.1 MI S OF CLINTON DR	1991	120' 0"	24' 0"
102	B22569 921 1	50	NW	493C	1300 WRIGHTWOOD ST	LITTLE WHITE OAK BAYOU	0.1 MI E OF HOUSTON AVE	1955	50' 0"	46' 0"
102	B62981 382 1	51	NW	453T	1600 ENID ST	LITTLE WHITEOAK BAYOU	0.12 MI W OF IH45	1943	120' 0"	25' 6"
102	B62981 382 1	52	NW	453T	1700 S VESTER ST	LITTLE WHITEOAK BAYOU	0.1 MI W OF IH 45	1969	98' 0"	25' 6"
102	B17793 539 1	53	SE	535B	8000 CYPRESS ST	BRAYS BAYOU	0.1 MI E OF BROADWAY	1980	197' 0"	39' 5"
102	B43449 507 1	54	SW	493K	1800 ALLEN PARKWAY	BUFFALO BAYOU	AT TAFT ST	1950	500' 0"	
102	B41921 479 1	55	SW	531Z	4700 MCDERMED ST	WILLOW WATERHOLE BAYOU	0.3 MI E OF POST OAK RD	1958	86' 0"	34' 0"
102	B46673 940 1	56	NW	451M	4000 MANGUM RD	BRICKHOUSE GULLY	0.4 MI W OF W 43RD ST	1965	79' 0"	54' 0"
102	B46977 502 1	57	SW	571X	15700 SAMOA WAY	DRAINAGE DITCH	AT WESTVIEW		20' 4"	4'
102	B46977 502 1	58	NW	451W	1500 HILLEDAHL BLVD	DRAINAGE DITCH	AT WESTVIEW		20' 4"	4'
102	B46673 940 1	59	NE	454S	5000 NECHES ST RD	HUNTING BAYOU	0.08 MI N OF US 59	1967	57' 0"	40' 1"
102	B46977 502 1	60	SW	531R	8300 NEWCASTLE DR	HCPCD DITCH	0.1 MI N OF BEECHNUT ST	1970	72' 0"	34' 0"
102	B09073 001 1	61	NW	450N	2500 TRIWAY	HCPCD DITCH	0.03 MI N OF NORTON			
102	B24809 008 1	62	NE	494M	7200 BOYCE ST	HCPCD DITCH	0.2 MI W OF US 90A	2011	26' 0"	24' 0"
102	B49009 007 1	63	SW	570M	13400 FONDREN RD SB	SIMS BYU	0.4 MI S OF US 90A	1972	92' 0"	33' 5"
102	B49009 007 1	64	SW	572K	3100 WEST OREM DR EB	HCPCD DITCH	2.7 MI E OF S POST OAK	1969	92' 0"	31' 5"
102	B62937 001 1	65	SW	576F	10800 HINDS	HCPCD DITCH	0.02 MI E OF DELWIN	1999	32' 5"	5' 3"
102	B62937 001 1	66	NW	452N	2500 W T C JESTER NB	HCPCD DITCH	0.1 MI NW OF JCT IH 610	1980	77' 0"	30' 0"
102	B69913 573 1	67	SW	531V	4800 WILLOWBEND EB	WILLOW WATERHOLE BAYOU	0.2 MI E OF S POSK OAK	1961	92' 0"	27' 0"



# MEASURE PHASE: DATA COLLECTION

## TEXAS DEPARTMENT OF TRANSPORTATION (TxDOT) BRIDGE DATABASE

0000_RouteID	0000_StructureID	1 File No	2 District	3 County	8 4 Control	8 5 Section	11 Milepnt	8 6 Str No	8 3 DupRtOver	5 1 RtStrFunc	Blanks1	5 3 Rt Design	5 6 RtBus Sfx	5 2 Rt System	5 4 Rt No
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# MEASURE PHASE: DATA COLLECTION

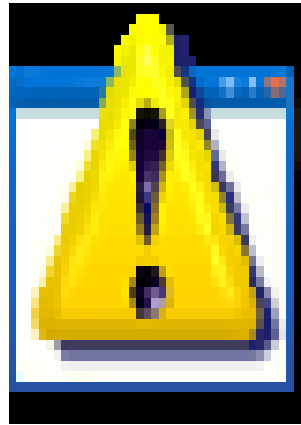
## COMBINED COH & TXDOT BRIDGE DATABASE



Houston Bridges 1-899 - [Shortcut.Ink](http://Shortcut.Ink)

# MEASURE PHASE:DATA COLLECTION

## COMBINED COH AND TXDOT BRIDGE DATABASE



Shortcut to Houston Bridges 2

# MEASURE: DATA COLLECTION

## COH FIELD ROUTE BOOK BRIDGE DATABASE

CITY OF HOUSTON - ROUTE BOOK  
NORTHWEST QUADRANT

REVISED  
03/13/12

BRDG #	PAGE #	CD	TYPE	BLOCK	STREET	LOC	CROSS	KEY MAP #	Inventoried
778	1	H	UP	400	HOUSTON AVE	UNDER	MEMORIAL	493L	
779	1	H	OP	1400	MEMORIAL WB	OVER	HOUSTON AVE	493L	9/6/2013
780	1	H	OP	1500	MEMORIAL EB	OVER	HOUSTON AVE	493L	
861	1	H	FB	1800	MEMORIAL	W OF	SABINE	493K	
725	1	H	OP	500	SAWYER	OVER	MEMORIAL	493K	
715	1	H	UP	1000	HOUSTON AVE	N OF	CENTER	493L	9/6/2013
17	1	H		2300	HOUSTON AVE	&	WHITE OAK BAYOU	493G	9/9/2013
50	1	H		1300	WRIGHTWOOD	&	WHITE OAK BAYOU	493C	9/10/2013
1196	1	H	CUL	1200	WHITE OAK	&	WHITE OAK BAYOU	493G	9/9/2013
18	1	H		2200	TAYLOR	&	WHITE OAK BAYOU	493F	9/9/2013
247	1	H		400	STUDEMONT	&	WHITE OAK BAYOU	493E	9/9/2013
748	1	H	UP	300	STUDEMONT	N OF	I-10	493E	
771	1	H	OP	2900	HICKS	OVER	STUDEMONT	493E	9/17/2013
723	1	H	UP	1200	STUDEMONT	UNDER	RR @ HICKS	493E	9/16/2013
20	1	H		200	HEIGHTS NB	&	WHITE OAK BAYOU	493E	9/16/2013
19	1	H		200	HEIGHTS SB	&	WHITE OAK BAYOU	493E	9/16/2013
21	1	H		200	YALE	&	WHITE OAK BAYOU	492H	9/16/2013
720	1	H	UP	100	YALE	N OF	WASHINGTON	492H	9/17/2013
22	1	H		500	NORTH SHEPHERD	&	WHITE OAK BAYOU	492D	9/17/2013
735	1	H	OP	600	NORTH SHEPHERD	&	7TH ST.	492D	9/17/2013
149	1	H		900	DURHAM	&	WHITE OAK BAYOU	492C	
702	1	H	OP	500	TC JESTER SB	OVER	EUREKA YARD	492C	9/19/2013
703	1	H	OP	500	T C JESTER NB	OVER	EUREKA YARD	492C	9/19/2013
641	1	H		800	T C JESTER NB	S OF	W 11TH	492C	9/19/2013
642	1	H		800	T C JESTER SB	S OF	W 11TH	492C	9/19/2013
700	1	H	OP	2500	OLD KATY RD	OVER	WASHINGTON AVE	492A	
714	1	H	UP	5000	WASHINGTON	UNDER	OLD KATY RD.	492A	
749	1	H	UP	7000	OLD KATY RD.	W OF	HEMPSTEAD @ RR	492A	
745	1	H	UP	8100	HEMPSTEAD 1ST.	N OF	OLD KATY RD.	492A	
746	1	H	UP	8100	HEMPSTEAD 2ND.	N OF	OLD KATY RD.	492A	
747	1	H	UP	8100	HEMPSTEAD 3RD.	N OF	OLD KATY RD.	492A	
23	1	A		2000	WEST 11TH.	&	WHITE OAK BAYOU	452Y	
1594	1	A	FB	2000	WEST 11TH.	&	WHITE OAK BAYOU	452Y	9/23/2013
46	1	A		900	WEST T C JESTER SB	N OF	W 11TH.	452Y	9/23/2013
141	1	A		900	WEST T C JESTER NB	N OF	W 11TH.	452Y	9/23/2013
220	1	A		1900	WEST 14TH.	E OF	BEALL	452Y	9/23/2013
221	1	A		1800	WEST 15TH.	E OF	BEALL	452Y	9/23/2013
91	1	A		1000	WEST 17TH.	E OF	BEALL	452Y	9/23/2013
222	1	A		1100	WEST 21ST.	W OF	BEALL	452U	9/24/2013
229	1	A		1200	WEST 22ND.	W OF	BEALL	452U	9/24/2013
228	1	A	CUL	1200	WEST 23RD.	W OF	BEALL	452U	9/24/2013
115	1	A	CUL	1200	WEST 24TH	W OF	BEALL	452U	9/24/2013
230	1	A		1200	WEST 25TH.	W OF	BEALL	452U	9/26/2013
240	1	A		1200	WEST 26TH.	W OF	BEALL	452U	9/26/2013

# MEASURE PHASE: DATA COLLECTION

## BRIDGE OWNERSHIP DISCREPANCIES

102	B09361	680	1	532L	N BRAESWOOD BLVD	KIRBY STORM DRAIN	0.05	MI	E OF KIRBY DR										NOT PART OF INVENTORY, in city limits
102	B09385	700	1	533E	BRAESWOOD BLVD	STORM DRAIN	0.2	MI	NE OF HOLCOMBE										NOT PART OF INVENTORY, in city limits
102	B64289	008	1	455A	TIDWELL E U-TURN	HCFC DITCH	0.2	MI	W OF N WAYSIDE DR										NOT PART OF INVENTORY
102	B44417	005	2	455J	LIBERTY RD	OVER MESA DR	0.1	MI	N OF US 90										NOT PART OF INVENTORY
102	B56249	002	1	493L	RUSK AVE	PEDESTRIAN WALKWAY	0.1	MI	SE OF BAGBY ST										NOT PART OF INVENTORY
102	B57601	001	1	574Q	SCARLET DR	HCFC DITCH	0.25	MI	W OF MYKAWARD										NOT PART OF INVENTORY
80	B22017	039	1	452T	ELLA BLVD	HCFC DITCH	0.15	MI	S OF IH 610N										NOT PART OF INVENTORY
102	B55995	001	1	295V	ROCK CREEK DR	SAN JACINTO TRIBUTARY	0.1	MI	N OF N PARK DR										NOT PART OF INVENTORY
102	B28052	001	1	45Y	GRAND WEST BLVD	DRAINAGE DITCH	0.01	MI	N OF IH 10 4										NOT PART OF INVENTORY, not in city limits
102	B21911	001	1	488G	DRVWY @ ELDRIDGE	TURKEY CRK	0.12	MI	S OF MEMORIAL DR										NOT PART OF INVENTORY, driveway
102	B06632	001	1	409Z	FISHER RD	COLE CRK	0.3	MI	S W LITTLE YORK										NOT PART OF INVENTORY, in city limits
102	B66825	004	1	411U	VICTORY DR	DRAINAGE DITCH	1.3	MI	E OF ANTOINE										NOT PART OF INVENTORY
102	B44417	007	6	415U	PEDESTRIAN X-ING	MESA DR	0.2	MI	S OF LITTLE YORK										NOT PART OF INVENTORY
102	B68511	002	1	446V	WEST PARK VIEW DR	S.MAYDE CRK	0.3	MI	N OF SAUMS RD										NOT PART OF INVENTORY
102	B68511	001	1	446Z	WEST PARK VIEW DR	S.MAYDE CRK	1MI	N	OF SAUMS RD										NOT PART OF INVENTORY
102	B71393	001	1	452Y	WYNNWOOD LN	HCFC DITCH	0.25	MI	E OF T C JESTER										NOT PART OF INVENTORY
102	B11145	060	1	490V	WOODWAY & BURGONYE	HCFC DITCH	0.5	MI	W OF S. VOSS RD										NOT PART OF INVENTORY, in city limits
102	B44185	006	5	492E	UNION PACIFIC RR	MEMORIAL DR EB	0.5	MI	E OF IH 610										NOT PART OF INVENTORY
102	B44185	007	5	492E	UNION PACIFIC RR	MEMORIAL DR WB	0.5	MI	E OF IH 610										NOT PART OF INVENTORY
102	B12209	002	1	493L	CAPITOL AVE	PARKING AREA	0.15	MI	SE OF BAGBY ST										NOT PART OF INVENTORY, parking garage
102	B37330	001	1	450Q	LACYBERRY ST	DRAINAGE DITCH	0.01	MI	N OF EMNORA LN 4										NOT PART OF INVENTORY
102	B53105	001	1	530D	RAMPART RD	WESTPARK TOLLWAY	0.5	MI	NW OF US 59										NOT PART OF INVENTORY
102	B11745	001	1	533E	CAMBRIDGE	BRAYS BAYOU	0.05	MI	S OF BRAESWOOD										NOT PART OF INVENTORY, in city limits
102	B34977	003	2	374A	AIRPLANE TAXIWAY	JFK BLVD, (SB)	0.2M	I	S OF S TERMINAL RD										NOT PART OF INVENTORY
102	B34977	004	2	374A	AIRPLANE TAXIWAY	JFK BLVD, (NB)	0.25	MI	S OF S TERMINAL RD										NOT PART OF INVENTORY
102	B34977	012	2	374A	AIRPLANE TAXIWAY	JFK BLVD NB	0.1	MI	N OF WILL CLAYTON										NOT PART OF INVENTORY
102	B34977	013	2	374A	AIRPLANE TAXIWAY	JFK BLVD SB	0.1	MI	N OF WILL CLAYTON										NOT PART OF INVENTORY
102	B47610	002	2	374B	AIRPLANE TAXIWAY	N TERM RD	AT T	ERM	INAL IAB										NOT PART OF INVENTORY
102	B60130	001	2	374B	AIRPLANE TAXIWAY	S. TERMINAL ROAD	AT T	ERM	INAL IAB PARKING										NOT PART OF INVENTORY
102	B69685	003	2	374B	AIRPLANE TAXIWAY	WILL CLAYTON PKWY	0.4	MI	E OF JFK BLVD										NOT PART OF INVENTORY
102	B69685	004	2	374B	AIRPLANE TAXIWAY	WILL CLAYTON PKWY	0.5	MI	E OF JFK BLVD										NOT PART OF INVENTORY
102	B34977	005	1	374A	AIRPORT VEH. RAMP	JFK BLVD, (SB)	0.2M	I	N OF S TERMINAL RD										NOT PART OF INVENTORY
102	B34977	006	1	374A	AIRPORT VEH. RAMP	JFK BLVD, (NB)	0.15	MI	S OF S TERMINAL RD										NOT PART OF INVENTORY
80	B34977	015	2	374E	RENTAL CAR AVE	JFK BLVD	2	MI	N OF GREENS RD										NOT PART OF INVENTORY
102	B34977	016	1	374K	JFK SERVICE RD	DRAINAGE DITCH	0.5	MI	N OF GREENS RD										NOT PART OF INVENTORY
102	B34977	017	1	374K	JFK BLVD NB	DRAINAGE DITCH	0.5	MI	N OF GREENS RD										NOT PART OF INVENTORY
102	B34977	018	1	374K	JFK BLVD SB	DRAINAGE DITCH	0.5	MI	N OF GREENS RD										NOT PART OF INVENTORY
102	B34977	019	1	374P	JFK BLVD SB	DRAINAGE DITCH	0.1	MI	N OF GREENS RD										NOT PART OF INVENTORY
102	B69685	005	1	374B	WILL CLAYTON PKWY	HCFC DITCH	0.8	MI	E OF JFK BLVD										NOT PART OF INVENTORY
102	B47610	003	1	374B	AIRPORT VEH. RAMP	N. TERMINAL RD.	AT T	ERM	INAL IAB										NOT PART OF INVENTORY
102	B60130	002	1	374B	AIRPORT VEH. RAMP	S. TERMINAL RD.	AT T	ERM	INAL IAB PARKING										NOT PART OF INVENTORY
102	B02249	005	1	NE 373V	15200 ALDINE-WSTFIELD SB	GREENS BAYOU	0.1	MI	N OF BELTWAY 8										NEW BRIDGE NEXT TO BRIDGE # 527. NEEDS TO BE ADDED TO INVENTORY
102	B16147	501	1	SW 529J	7500 COOK RD	HCFC DITCH	0.1	MI	N OF CORONA										NEW BRIDGE NEXT TO BRIDGE # 672. NEEDS TO BE ADDED TO INVENTORY
102	B28682	001	1	NE 372V	GREENS POINT DR.	HCFC DITCH	0.25	MI	S OF BELTWAY 8										NOT PART OF INVENTORY
102	B29249	007	1	NW 411Q	5400 W GULF BANK RD	VOGEL CREEK	0.4	MI	E OF ANTOINE										NEW BRIDGE NEXT TO BRIDGE # 456. NEEDS TO BE ADDED TO INVENTORY
102	B30225	003	1	373T	15000 W. HARDY	HCFC DITCH	0.03	MI	N OF FM 525										NOT PART OF INVENTORY
102	B36642	502	1	SW 529J	7500 S. KIRKWOOD	HCFC DITCH	0.5	MI	S OF BELLAIRE BLVD										NEW BRIDGE NEXT TO BRIDGE # 671. NEEDS TO BE ADDED TO INVENTORY
102	B37610	001	1	377L	LAKE SHORE LANDING	DRAINAGE DITCH	0.5	MI	W. OF LAKE HOUSTON PKWY										NOT PART OF INVENTORY
102	B38857	040	1	374H	1700 LEE	DRAINAGE DITCH	0.15	MI	S OF WILL CLAYTON										NOT PART OF INVENTORY
102	B44185	021	1	491H	8000 MEMORIAL	MEMORIAL PARK	0.55	MI	E OF IH 610										NOT PART OF INVENTORY
102	B44185	022	1	491H	8000 MEMORIAL	MEMORIAL PARK	0.55	MI	E OF IH 610										NOT PART OF INVENTORY
102	B44185	023	1	490M	10700 MEMORIAL	HCFC DITCH	0.2	MI	E OF VOSS										NOT PART OF INVENTORY
102	B48674	001	1	375W	14600 OLD HUMBLE ROAD	DRAINAGE DITCH	0.01	MI	NE OF EDDIE DR.										NOT PART OF INVENTORY
102	B52313	001	1		SOUTH POST OAK	JCT OF IHW & IH 610	AT		IH610										NOT PART OF INVENTORY
102	B53221	004	1	374K	3700 RANKIN	HCFC DITCH	0.05	MI	E OF JFK BLVD										NOT PART OF INVENTORY
102	B55777	434	1	452E	5000 ROSSLYN	HCFC DITCH	0.07	MI	N OF BETHLEHEM										NOT PART OF INVENTORY
102	B62921	008	1	411V	7400 T.C. JESTER	HCFC DITCH	AT		VICTORY										NOT PART OF INVENTORY
102	B68890	001	1	445Y	WESTSIDE PARKWAY	HCFC DITCH	0.01	MI	N OF IH 10										NOT PART OF INVENTORY
102	B39913	609	1	NE 414S	2800 LITTLE YORK	HALLS BAYOU	0.08	MI	E OF SHADY LN										NEW BRIDGE NEXT TO BRIDGE # 407. NEEDS TO BE ADDED TO INVENTORY
102	B69685	031	2	374B	SOUTH TERMINAL RD	WILL CLAYTON PKWY WB	0.5	MI	E OF JFK BLVD										
102	B69685	032	2	374B	WILL CLAYTON CONN	WILL CLAYTON PKWY	0.7	MI	E OF JFK BLVD										
102	B69685	037	2	374C	SOUTH TERMINAL RD	WILL CLAYTON PKWY WB	0.8	MI	E OF JFK BLVD										
102	B47610	001	1	374B	S TERMINAL RD	WILL CLAYTON PKWY CONN	0.1	MI	E OF TERMINAL IAB										
102	B34977	014	2	374A	SERVICE RD	JFK BLVD	0.2	MI	S OF WILL CLAYTON										

# ANALYZE PHASE – COH BRIDGE DATABASE DISCREPANCIES

- TOTAL CURRENT BRIDGE INVENTORY= 1689
- UNASSIGNED BR. NUMBER INVENTORY= 262
- DISPUTED BRIDGES (OWNERSHIP)= 62
- RAILS THAT SPECIFIED AS BRIDGES = 5
- UNDERPASS THAT SPECIFIED AS BRIDGES = 44
- PIPES WITH LESS THAN 6' DIAMETER= 35
- CONC. BOX CULVERTS WITH  $L < 20'$  = 132
- TOTAL TxDOT INSPECTED BRIDGES( $L > 20'$ )= 969
- TOTAL COH INSPECTED BRIDGES( $L < 20'$ )= 386
- BRIDGES WITH MISSING INFORMATION= 366

# ANALYZE PHASE: C&ED

## CAUSE

## EFFECT

Guidelines

Communication

Information

Not Exist

Engineering  
TxDOT  
Constriction

construction  
Contract  
Engineering

Data Base  
Discrepancies

COH D.B.  
TxDOT D.B.

Harris CO.  
PWE  
PARK  
AIRPORT

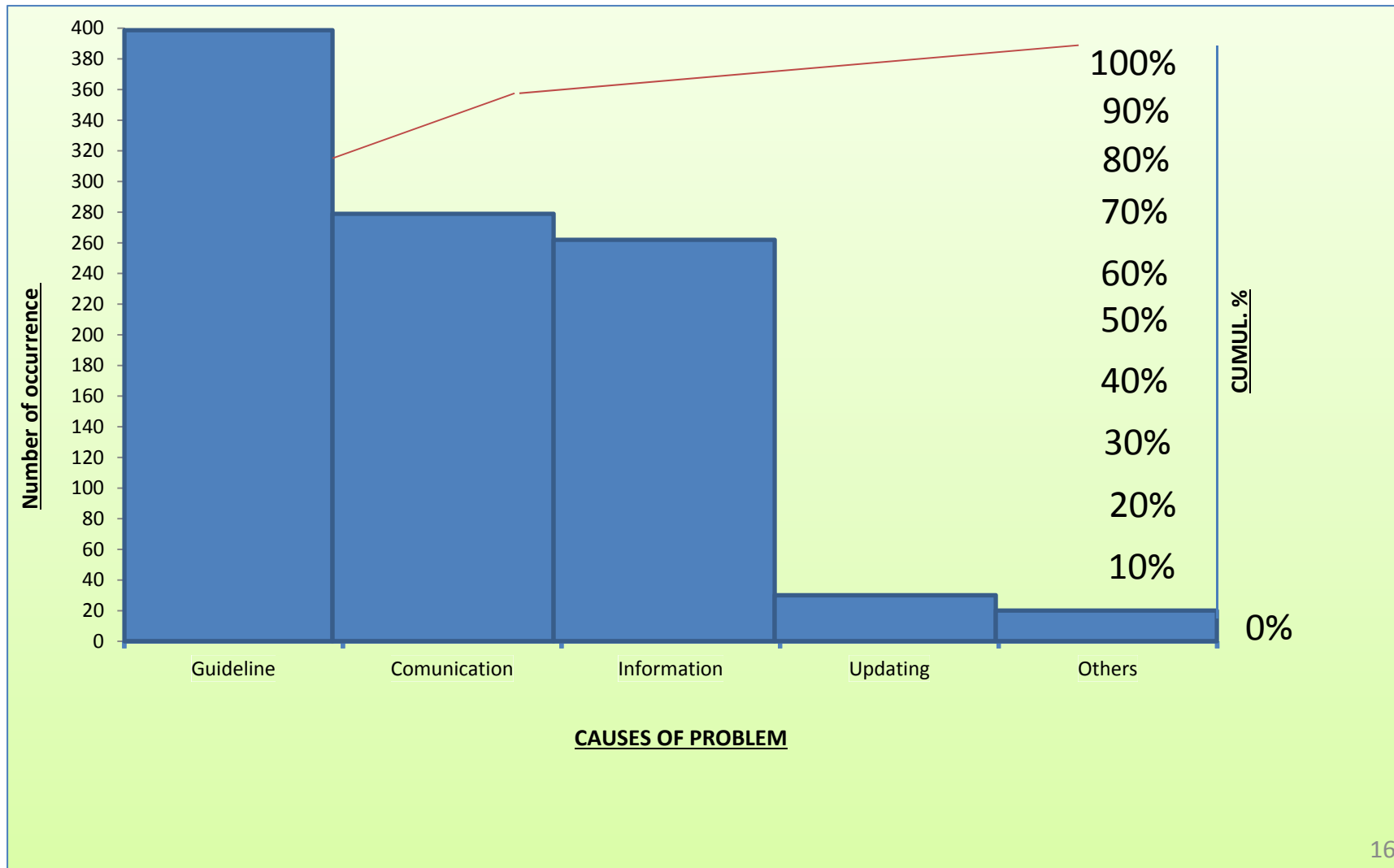
SDD  
TxDOT

Bridge Data Mod.

Ownership Issues

Bridge Data Entry

# ANALYZE PHASE: PARETO CHART





# ANALYZE PHASE- 5 WHY'S

DEFINE THE PROBLEM: THERE IS NOT A GUIDLINE OR PROCEDURE FOR BRIDGE DATA ENTERY, UPDATE, AND CONTROL.

IT WAS NOT A REQUIREMENT

WHY IS THAT?

IT DID NOT EXIST

WHY IS THAT?

NO ONE KNEW ABOUT IT

WHY IS THAT?

WORK WAS DONE WITHOUT IT

WHY IS THAT?

IT WAS ALWAYS DONE THAT WAY

ACTION: PREPARE , APPROVE, AND UTILIZE A GUIDELINE OR PROCEDURE FOR BRIDGE DATA ENTRY, UPDATE, AND CONTROL.

# **IMPROVE: REVIEW EXISTING BRIDGE DATABASE**

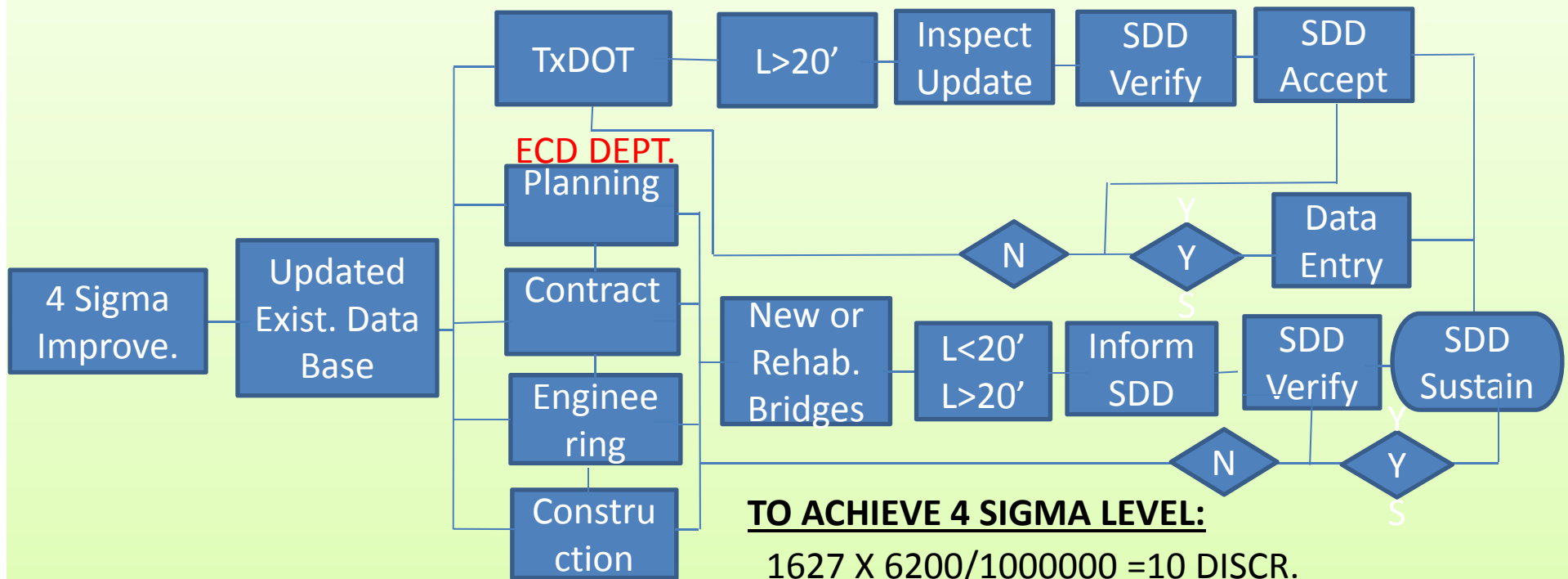
- COMMUNICATE WITH TxDOT REGARDING COH BRIDGE DATABASE DISCREPANCIES
- RESOLVE BRIDGE OWNERSHIP DISPUTES BETWEEN COH, AIRPORT, AND HARRIS CO.
- RESOLVE BRIDGE OWNERSHIP DISPUTES BETWEEN PWE AND PARK AND RECREATIONAL
- UPDATE EXISTING BRIDGE DATABASE BASED ON THE ABOVE RESOLUTIONS
- PREPARE A GUIDELINE FOR FUTURE BRIDGE DATA ENTRY AND MAINTENANCE

# IMPROVE PHASE: OBJECTIVES

- TO CREATE AN IMPROVED AND EFFECTIVE BRIDGE DATA ENTRY AND MAINTENANCE :
  - A) REVIEW EXISTING BRIDGE DATABASE TO DETECT EXISTING BRIDGE DATA BASE DISCREPANCIES
  - B) PREPARE A BRIDGE DATA ENTRY AND MAINTENANCE GUIDELINE
  - C) ELIMINATE OR REDUCE THE NUMBER OF KNOWN DISCREPANCIES POSSIBLE; UPDATE THE EXISTING BRIDGE DATABASE ACCORDINGLY
  - D) BUILD ON THE UPDATED BRIDGE DATABASE BY PREPARING AND USING AN APPROVED BRIDGE DATA ENTRY AND MAINTENANCE GUIDELINE
  - E) SUSTAIN THE BRIDGE DATABASE BY CREATING A LINK BETWEEN SDD AND ECD DEPARTMENTS, EXERCISE BETTER COMMUNICATION METHOD, BETER INFORMATION FLOW, AND TIMELY BRIDGE DATA ENTRY

# IMPROVE PHASE: IMPROVED PROCESS

## FLOW CHART OF IMPROVED BRIDGE DATA ENTRY AND MAINTENANCE PROCESS:



### TO ACHIEVE 4 SIGMA LEVEL:

$$1627 \times 6200 / 1000000 = 10 \text{ DISCR.}$$

1627 = Total of COH Bridge Inventory

1,000,000 = A Million Opportunities

6200 = DPMO

# IMPROVE PHASE: ELIMINATE OR JUSTIFY EXISTING DISCREPANCIES

- A) REMOVED/JUSTIFIED 179 UNASSIGNED /UNUSED NUMBERS
- B) REMOVED/JUSTIFIED 83 DELETED BRIDGE NUMBERS
- C) COMPLETED MISSING DATA FOR 366 BRIDGES
- D) CLARIFIED OWNERSHIP OF 62 BRIDGES BY ADDING PENDING RESOLUTION IN THE ASSOCIATED COLUMNS
- E) HAVE ESTABLISHED A LINK BETWEEN SDD AND ECD
- F) REMOVED/JUSTIFIED 84 ITEMS THAT DO NOT MEET BRIDGE DEFINITION (RAILS, UNDERPASSES, AND PIPES WITH LESS THAN 6' IN DIAMETR
- G) DEVELOP A GUIDELINE FOR FURURE BRIDGE DATA ENTRY AND MAINTENANCE

## **IMPROVE: UPDATE BRIDGE DATABASE** **BASED ON ESTABLISHED GUIDELINES**

- ESTABLISH A COMMUNICATION NETWORK WITH COH ECD DEPARTMENTS (ENGINEERING, CONST.)
- ESTABLISH A COMMUNICATION NETWORK WITH TxDOT REGARDING COH BRIDGES (L>20')
- ATTEND MEETINGS REGARDING NEW OR REHAB. BRIDGE CONSTRUCTION AND IMPROVEMENTS
- OBTAIN AND ARCHIVE NEW AS-BUILT BRIDGE PLANS
- REGULARLY REVIEW AND UPDATE THE NEW COH BRIDGE DATABASE

## **CONTROL PHASE**

- FOLLOW BRIDGE DATABASE ENTRY AND MAINTENANCE GUIDELINES
- INFORMATION TECHNOLOGY (IT) TO CRAETE A COMPUTER LINK BETWEEN BRIDGE DIVISION AND COH ECD DEPARTMENTS FOR REPORTING NEW BRIDGE CONSTRUCTION OR CHANGES
- MAP THE NEW PROCESS FOR FUTURE USE AND REFERENCE
- ADOPT AND SET THE NEW PERFORMANCE TARGETS

## **CONTROL PHASE**

- TRAIN AND ASSIGN AN EMPLOYEE FOR RECEIVING AND ENTERING CHANGES TO THE COH BRIDGES
- KEEP BRIDGE DATABASE UP TO DATE AT ALL TIMES
- COMMUNICATE EFFECTIVELY WITH THE OTHER PARTIES REGARDING NEW BRIDGE CONSTRUCTION, REHABILITATION, AND IMPROVEMENTS
- REVIEW AND ENTER RECEIVED BRIDGE DATA IN A TIMELY MANNER AND PER ESTABLISHED BRIDGE DATA ENTRY GUIDELINES
- LOAD THE BRIDGE DATABASE IN ANY COH DRIVES AS "FOR READ ONLY"
- CHANGES TO BRIDGE DATABASE SHOULD BE DONE BY AN AUTHORIZED AND RESPONSIBLE EMPLOYEE

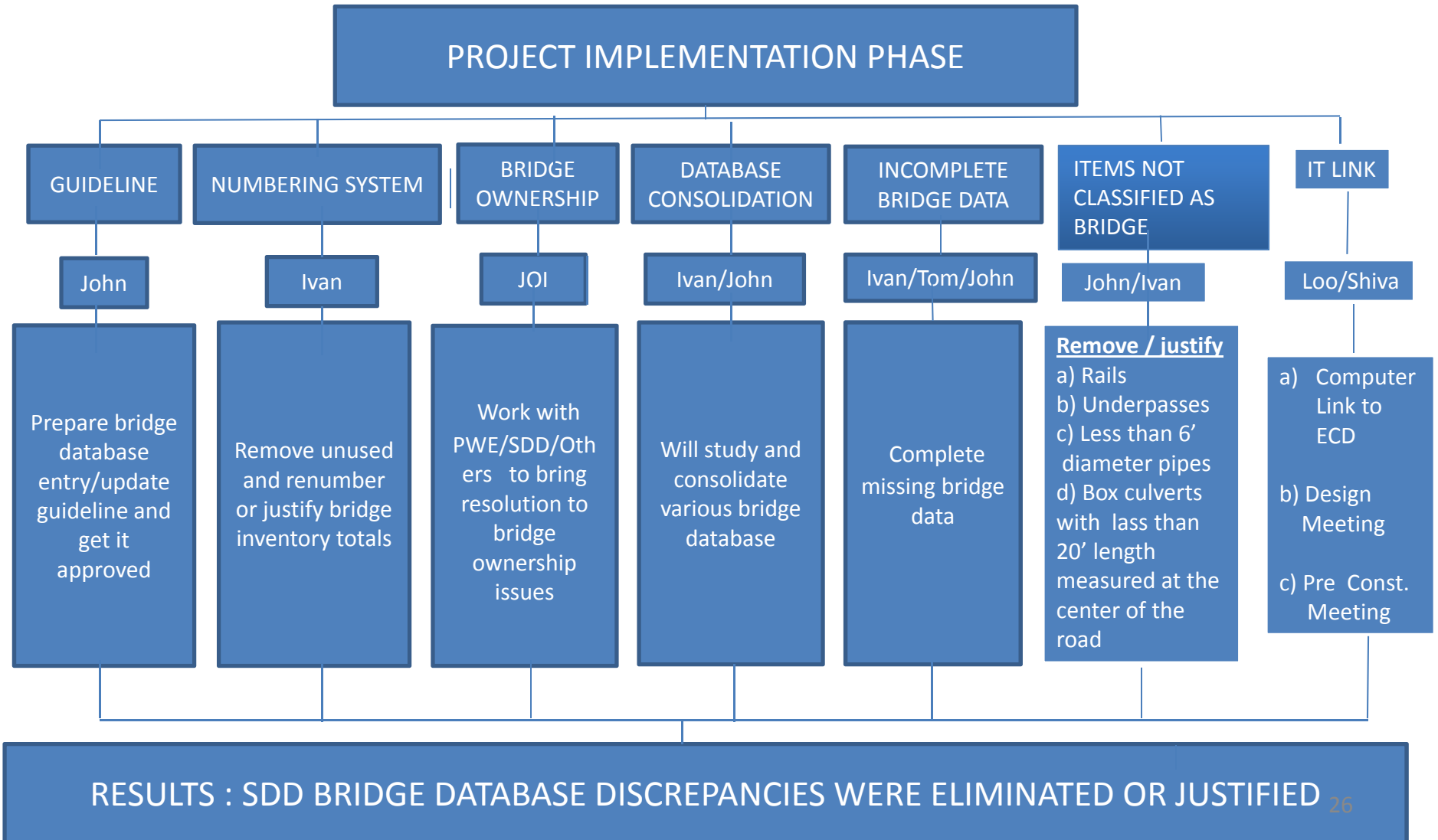


# CONTROL PHASE

## BENEFITS OF BRIDGE DATABASE CONTROL:

- ELIMINATES WASTED TIME AND OPPORTUNITIES
- ADD VALUES TO COH ASSET MANAGEMENT AND FINANCE INVENTORIES
- ACCURATE AND RELIABLE BRIDGE INFORMATION IS AVAILABLE AT ALL TIMES
- CITY OF HOUSTON WILL BENEFIT FROM STATE AND FEDERAL TRANSPORTATION PROGRAMS (Federal Transportation Bill and State Transportation Program (T.I.P.))
- BRIDGE DISPUTES AND CLAIMS WILL BE RESOLVED MUCH FASTER DUE TO AVAILABE BRIDGE IFNO.

# LEAN SIX SIGMA PROJECT IMPLEMENTATION PHASE



# NEW AND IMPROVED COH BRIDGE DATABASE



## HOUSTON BRIDGES 1-900

- 1) REMOVE OR JUSTIFY UNUSED BRIDGE NUMBERS; THESE NUMBERS MAY BE USED FOR NEW BRIDGES
- 2) REMOVE ALL PIPES WITH DIAMETER OF LESS THAN 6 FEET; SEND TO DRAINAGE SECTION FOR MAINTENANCE  
  
REMOVE/JUSTIFY RAILS AND UNDERPASSES
- 3) IDENTIFY ALL BOX CULVERTS WITH LESS THAN 20 IN LENGTH MEASURED AT THE CENTERLINE OF THE ROAD
- 4) REMOVE ALL MAINTENANCE RECORDS; DO NOT REMOVE BRIDGE ID CARD AND PICTURES  
  
5) CREATE A MAINTENANCE FILE TO KEEP MAINTENANCE RECORDS FOR 3 YEARS
- 6) INSERT TxDOT BRINSAP FILES AND KEEP FOR 3 YEARS
- 7) INSERT COH INSPECTION FILES AND KEEP FOR 3 YEARS



## HOUSTON BRIDGES 900 -1627

- 1) REMOVE OR JUSTIFY UNUSED BRIDGE NUMBERS, MAY BE USED FOR NEWLY CONSTRUCTED BRIDGES
- 2) REMOVE ALL PIPES WITH DIAMETER OF LESS THAN 6 FEET, SEND THE LIST TO DRAINAGE SECTION FOR MAINTENANCE  
  
REMOVE/JUSTIFY RAILS AND UNDERPASSES
- 3) IDENTIFY ALL BOX CULVERTS WITH LESS THAN 20 IN LENGTH MEASURED AT THE CENTER OF THE ROAD
- 4) REMOVE ALL MAINTENANCE RECORDS; DO NOT REMOVE BRIDGE ID CARD AND PICTURES  
  
5) CREATE A MAINTENANCE FILE TO KEEP MAINTENANCE RECORDS FOR 3 YEARS
- 6) INSERT TxDOT BRINSAP FILES AND KEEP FOR 3 YEARS
- 7) INSERT COH INSPECTION FILES AND KEEP FOR 3 YEARS



## BRIDGE SPREADSHEET

- 1) REMOVE OR JUSTIFY UNUSED BRIDGE NUMBERS. USE THEM FOR NEW BRIDGES
- 2) REMOVE ALL PIPES WITH DIAMETER OF LESS THAN 6 FEET
- 3) IDENTIFY ALL BOX CULVERTS WITH LESS THAN 20' IN LENGTH
- 4) DETERMINE AND LIST NEEDED AND MOST USED BRIDGE ATTRIBUTES (BR. ID, Geometry, Location, Feature crossed, etc.)
- 5) Open an additional column and list all associated TxDOT BR. IDs)
- 6) UPDATE FOR ANY FUTURE BRIDGE DATA CHANGES

USE SDD EXCEL SPREADSHEET, REFINED 1, 2, 3, TxDOT BRINSAPS, AND COH INSPECTION FILES TO CREATE AND ESTABLISH A NEW COH BRIDGE DATABASE. THE NEW BRIDGE DATABASE SHOULD BE REVIEWED, MONITORED, AND UPDATED FOR ANY NEW BRIDGE DATA CHANGES.

QUESTIONS AND ANSWERS

????????????????????