

## APPENDIX D – POTENTIAL LOSSES

### ***Flood Scenario (100 year event)***

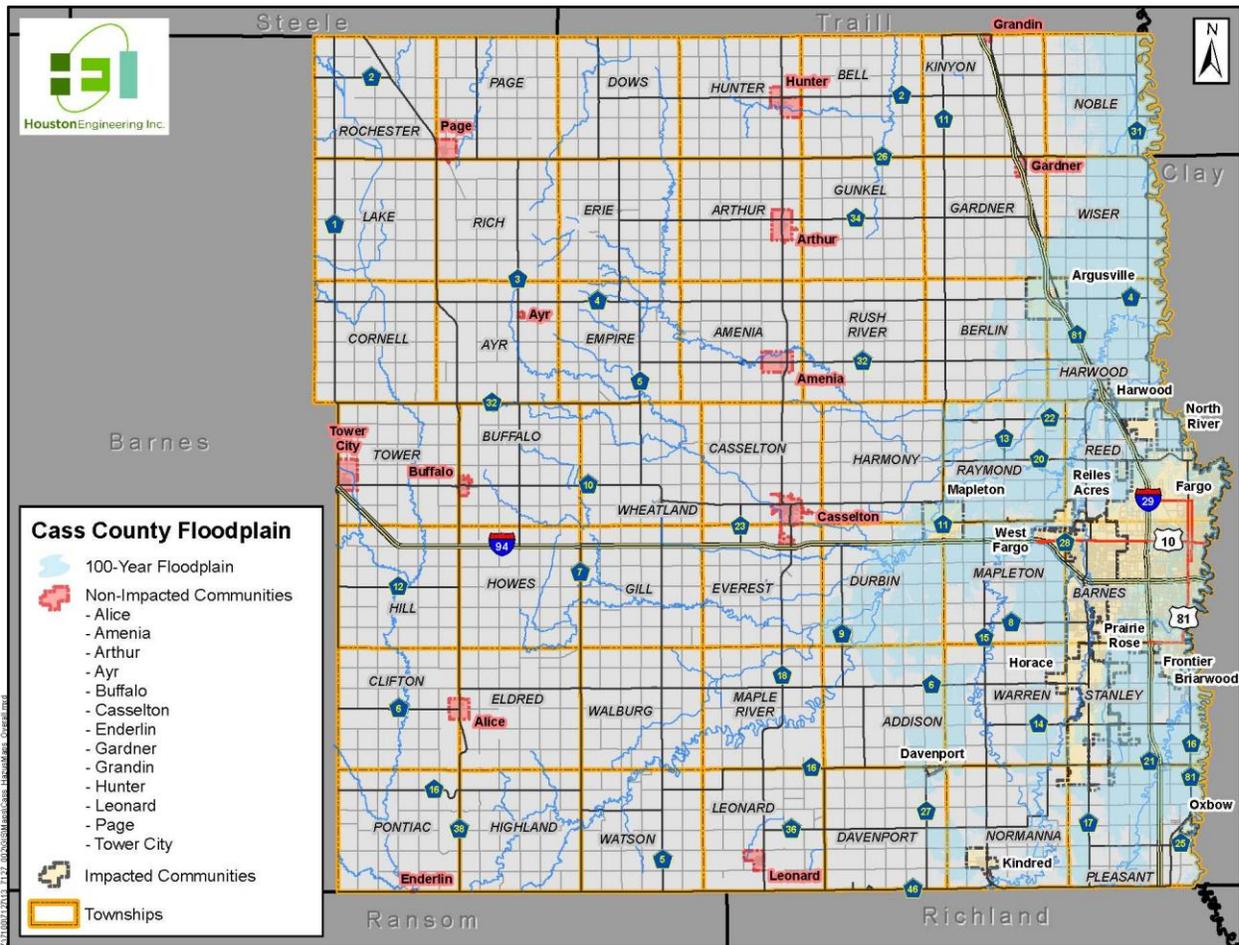
The Steering committee felt the best available data to utilize for potential flood losses during a 100-year flood event is from the USACE. The floodplain utilized for the losses provided in this appendix was produced for the USACE for the FM Diversion. It is meant to represent a 100-year flood event with existing conditions. This flood model was created for phase 7 of the diversion project. The wet cycle hydrology which analyzed the wet portion of the period of record or the years 1942 to 2009 went into the development of this flood model. For more information regarding the wet cycle hydrology see

[http://www.fmdiversion.com/PowerPointpresentations/May2012/Gregg\\_Thielman-20120419\\_ND\\_Legislative\\_Water\\_Related\\_Topics\\_Overview\\_Committee\\_Hydrology.pdf](http://www.fmdiversion.com/PowerPointpresentations/May2012/Gregg_Thielman-20120419_ND_Legislative_Water_Related_Topics_Overview_Committee_Hydrology.pdf).

A county-wide map of the floodplain utilized can be seen below as Figure D1. Additional detail on individual jurisdictions can be found in Section VI of this Plan. Interactive maps can be accessed at <http://cityoffargond.maps.arcgis.com/home/webmap/viewer.html?webmap=863c4078f19b47ec9b86df6f8e371b65>. Detailed tables of projected losses follow as Tables D1 and D2.

A HAZUS run was also conducted utilizing FEMA stock data. As the committee did not feel this was the best available information it is not included in this plan; however, the data is available for review upon request.

**Figure D1 Countywide 100-year Floodplain Map**



**Table D1 Critical Facilities Losses in Cass County, 100-year Flood Event**

Critical Facilities	Number Impacted*	Total*	Building Loss	Content Loss	Grand Total
Fire	1	25	\$320,813	\$2,215,354	\$2,536,166
Police	2	4	\$169,727	\$290,961	\$460,688
Schools	14	55	\$3,187,617	\$17,809,491	\$20,997,108
Hospital	8	9	\$2,081,597	\$4,383,230	\$6,464,827
Lift Stations	68	237	\$1,576,512	\$0	\$1,576,512
Wastewater Treatment	17	45	\$1,232,454	\$0	\$1,232,454
Civil / Shelters	2	24	\$3,156,534	\$21,976,346	\$25,132,879
Wells, Towers, Power	11	50	N/A**	N/A**	N/A**
<b>Grand Total</b>	<b>123</b>	<b>449</b>	<b>\$11,725,254</b>	<b>\$46,675,381</b>	<b>\$58,400,635</b>

**Table D2 Non-Critical Facilities, Losses by Occupancy Class in Cass County, 100-year Flood Event**

Occupancy	Building Count	Building Losses	Content Losses	Inventory Losses	Grand Total
<b>Commercial</b>					
COM1	366	\$10,133,527	\$30,783,479	\$35,901,829	
COM10	4	\$367	\$604	\$0	
COM2	265	\$1,286,881	\$5,429,671	\$6,701,712	
COM3	81	\$1,071,571	\$5,165,605	\$0	
COM4	166	\$6,519,985	\$8,736,504	\$0	
COM5	12	\$2,191,299	\$14,258,477	\$0	
COM6	4	\$4,324,706	\$7,821,612	\$0	
COM7	17	\$1,081,554	\$4,849,379	\$0	
COM8	31	\$1,963,854	\$5,945,454	\$0	
COM9	2	\$517,736	\$1,037,859	\$0	
COM1	13	\$28,509	\$59,922	\$112,220	
COM2	20	\$479	\$45,918	\$61,001	
COM3	2	\$0	\$84,678	\$0	
COM4	2	\$2,307	\$2,307	\$0	
<b>Total</b>	<b>985</b>	<b>\$29,122,774</b>	<b>\$84,221,470</b>	<b>\$42,776,763</b>	<b>\$156,232,007</b>
<b>Education</b>					
EDU1	27	\$2,415,183	\$13,104,696	\$0	
EDU2	6	\$2,351,308	\$23,642,846	\$0	
<b>Total</b>	<b>33</b>	<b>\$4,766,492</b>	<b>\$36,747,541</b>	<b>\$0</b>	<b>\$41,514,033</b>
<b>Government</b>					
GOV1	9	\$190,492	\$1,116,332	\$0	
<b>Total</b>	<b>9</b>	<b>\$190,492</b>	<b>\$1,116,332</b>	<b>\$0</b>	<b>\$1,306,824</b>
<b>Industrial</b>					
IND2	1	\$74	\$0	\$0	
IND3	19	\$5,539,989	\$19,713,528	\$17,665,004	
IND4	4	\$48,949	\$380,538	\$452,347	
IND2	2	\$487	\$0	\$0	
<b>Total</b>	<b>30</b>	<b>\$5,589,499</b>	<b>\$20,136,937</b>	<b>\$18,174,513</b>	<b>\$43,900,949</b>
<b>Religious</b>					
REL1	53	\$881,295	\$7,839,779	\$0	
<b>Total</b>	<b>53</b>	<b>\$881,295</b>	<b>\$7,839,779</b>	<b>\$0</b>	<b>\$8,721,074</b>
<b>Residential</b>					
RES1	11726	\$90,768,456	\$24,567,218	\$0	
RES2	484	\$421,614	\$71,690	\$0	
RES3A	944	\$1,048,550	\$1,666,347	\$0	
RES3B	238	\$813,173	\$904,656	\$0	
RES3C	180	\$1,334,455	\$1,191,715	\$0	
RES3D	261	\$5,939,960	\$3,139,215	\$0	
RES3E	557	\$27,951,819	\$14,950,540	\$0	
RES3F	109	\$8,768,229	\$3,899,318	\$0	
RES4	1	\$26,063	\$47,783	\$0	
RES6	23	\$282,595	\$645,637	\$0	
RES1	125	\$1,121,803	\$242,561	\$0	

RES6	2	\$0	\$0	\$0	
<b>Total</b>	<b>14650</b>	<b>\$138,476,718</b>	<b>\$51,326,679</b>	<b>\$0</b>	<b>\$189,803,397</b>
<b>Grand Total</b>	<b>15760</b>	<b>\$179,027,270</b>	<b>\$201,388,738</b>	<b>\$60,951,275</b>	<b>\$441,367,284</b>

Source: Houston Engineering

### Tornado Scenario

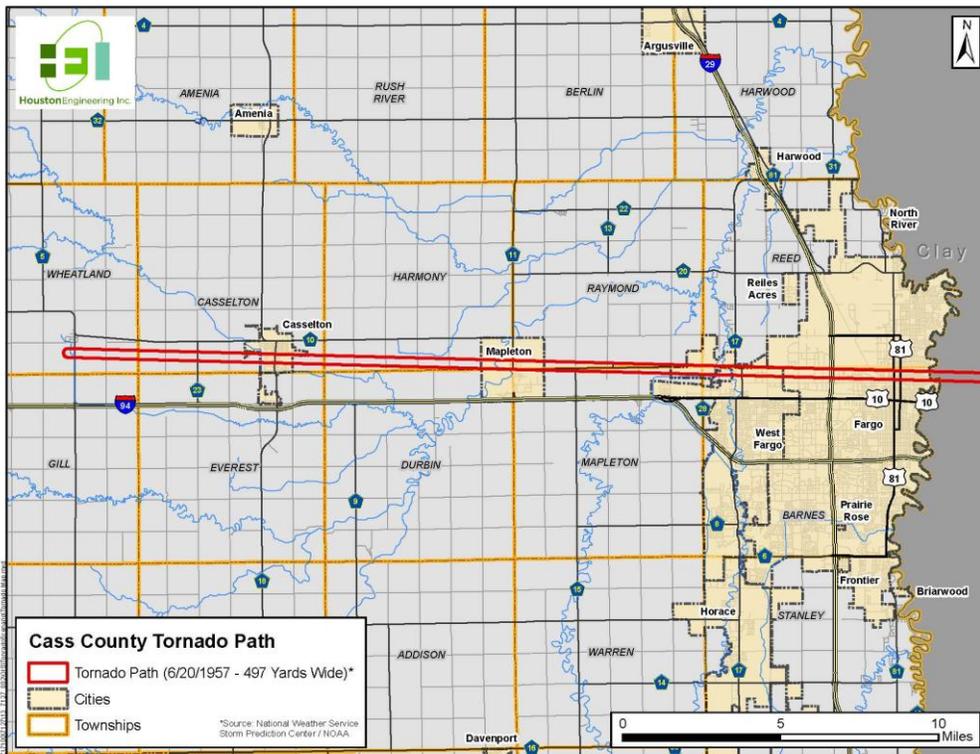
By nature, tornadoes can occur anywhere, making estimation of losses difficult. An actual tornado path that touched down in Cass County in 1957 was chosen to be used to estimate losses today should that same tornado occur. Although it is unlikely to happen just this way again, the devastation should a tornado of this magnitude happen in a built up area of the County again, similar losses could be experienced. Details of that event can be found in **Table B1**. A map of the location is shown as **Figure B1**.

**Table B.1 Tornado Event**

Tornado Number (NOAA)	591
Date	6/20/1957
F Scale	5
Injuries	103
Fatalities	10
Loss	Estimated \$5 - \$50 million
Latitude	46.9 to 46.87
Longitude	-97.35 to -96.23
Length	52.4 miles
Width	497 yards (rounded in scenario to 500 yds)

Source: National Weather Service Storm Prediction Center/NOAA

**Figure B.1 Tornado Location**



Impacted facilities today should such an event occur today can be found in **Tables B2 and B3**. Although uncommon the tremendous impacts a tornado can have contributed to Severe Summer Storms receiving a risk class of B. Should the tornado of 1957 occur today you can see that a value of nearly \$28 million in critical buildings would be lost and over \$450 million worth of non-critical facilities such as residences and commercial structures.

**Table B3 Critical Facilities Losses**

Type	Facility Name	Building Value
Hospital	Sanford Health	\$793,233
Hospital	Sanford Health	\$13,846,600
School	Madison Elementary School	\$2,212,000
School	Roosevelt Elementary School	\$2,088,000
School	Horace Mann Elementry School	\$2,157,000
Utility	Solid Waste	\$5,608,744
Utility	Sanitary Lift Station	\$110,000
Utility	Storm Lift Station - 29	\$100,791
Utility	Storm Lift Station - 37	\$195,858
Utility	Sanitary Lift Station - 42	\$72,601
Utility	Sanitary Lift Station - 3	\$292,677
Utility	Storm Lift - SM43	\$32,832
Utility	Sanitary Lift - SA18	\$110,585
Utility	Sanitary Lift - SA29	\$15,504
Utility	Sanitary Lift - SA32	\$100,958
Utility	Sanitary Lift - SA37	\$167,518
<b>Total (16 facilities)</b>		<b>\$27,904,901</b>

Source: Houston Engineering

**Table B2 Non-Critical Facilities, Losses by Occupancy Class**

Occupancy	Building Count	Sum of Building Values	Sum of Content Values	Grand Total
<b>Commercial</b>				
COM1	84	\$32,485,813	\$32,485,813	
COM10	3	\$125,000	\$62,499	
COM2	33	\$18,998,735	\$18,998,735	
COM3	5	\$6,675,500	\$6,675,500	
COM4	2	\$246,900	\$246,900	
COM6	1	\$10,663,225	\$15,994,837	
COM7	4	\$2,822,654	\$4,233,981	
COM8	4	\$550,800	\$550,800	
<b>Total</b>	<b>136</b>	<b>\$72,568,627</b>	<b>\$79,249,065</b>	<b>\$151,817,692</b>
<b>Industrial</b>				
IND2	1	\$705,300	\$1,057,950	
IND3	10	\$6,856,400	\$10,284,599	
<b>Total</b>	<b>11</b>	<b>\$7,561,700</b>	<b>\$11,342,549</b>	<b>\$18,904,249</b>
<b>Religious</b>				
REL1	4	\$827,201	\$827,201	
<b>Total</b>	<b>4</b>	<b>\$827,201</b>	<b>\$827,201</b>	<b>\$1,654,402</b>
<b>Residential</b>				

RES1	1767	\$123,133,932	\$61,566,947	
RES2	97	\$745,294	\$372,625	
RES3A	185	\$12,582,340	\$6,291,141	
RES3B	90	\$7,621,754	\$3,810,868	
RES3C	73	\$7,145,024	\$3,572,500	
RES3D	37	\$7,377,700	\$3,688,843	
RES3E	16	\$9,441,755	\$4,720,873	
RES3F	9	\$14,520,994	\$7,260,495	
RES4	2	\$3,584,500	\$1,792,250	
<b>Total</b>	<b>2276</b>	<b>\$186,153,293</b>	<b>\$93,076,542</b>	<b>\$279,229,835</b>
<b>Grand Total</b>	<b>2427</b>	<b>\$267,110,821</b>	<b>\$184,495,357</b>	<b>\$451,606,178</b>

Source: Houston Engineering