

APPENDIX C

Changes to Sensitivity Rankings Based on Public Comment and Data Submitted

Changes to Sensitivity Rankings Based on Public Comment and Data Submitted

As a result of public comments, the sensitivity of the pipeline at specific locations has been changed. There were no changes to the 21.69 miles of pipeline route that are shown as hypersensitive (Tier 3 mitigation required) in Table 7-2 of the EA. However, there were four sets of changes to the 102.20 miles of sensitive areas (Tier 2 mitigation required) in Table 7-1 of the EA. A revised Table 7-1 follows this page. The numbers and letters in bold and strike out in the Revised Table 7-1 indicate changes to this table. The changes, and the reasons for the changes, are summarized below.

1. Ground water sensitivities in Bastrop County. Uprated 23.76 miles to sensitive between MP 125.6 and MP 157.7.
2. City of Austin purchase of land for watershed Protection preserves (see Map in this appendix) Uprated 0.5 miles to sensitive between MP 177.9 and 178.4.
3. City of Big Spring no longer uses wells near the pipeline. Downrated 13 miles from sensitive between MP 410 and 423.
4. City of Grandfalls no longer uses wells near the pipeline. Downrated 3 miles sensitive between MP 492 and 495.

The new total mileage for Tier 2 areas is revised to 110.46 from the 102.20 in the draft EA. The net gain in Tier 2 mileage is 8.26 miles.

The Revised Table 7-1 also shows in bold where previously sensitive areas have new or additional criteria for being sensitive (i.e., there is no change from sensitive to hypersensitive but more criteria for which the area is designated as sensitive).

Some of the sensitivity assignments in Table 7-1 are based upon a revised Table 4-14. This revised Table 4-14 is also included in this appendix.

**Revision of EA Table 7-1
“Sensitive Areas” for Mitigation Measure Development**

Begin Mile	End Mile	Length (mile)	Sensitivity Factors	Drinking Water		Human Population	Sensitive Species	Recreation
				Ground Water	Surface Water			
1.2	1.8	0.6	P1			X		
2.6	3.9	1.3	P1			X		
4	4.7	0.7	P1, R1			X		X
4.7	5.5	0.8	R1					X
5.5	6.2	0.7	P1			X		
7.4	7.8	0.4	P1			X		
8.3	9.6	1.3	P1			X		
9.6	10.7	1.1	P1, R1			X		X
11.2	26.7	15.5	P1			X		
27.5	33.5	6	P1			X		
35	36.4	1.4	P1			X		
63.85	64.06	0.21	R2					X
74.5	75.1	0.6	P2			X		
123.2	123.9	0.7	P3			X		
124.8	125.2	0.4	P3			X		
125.6	127.5	1.9	GW1	X				
127.5	128.9	1.4	R3, GW7	X				X
128.9	131.3	2.4	GW1	X				
131.3	131.54	0.24	R4, GW1	X				X
131.54	134.38	2.84	GW1	X				
134.38	134.57	0.19	GW1, R5	X				X
134.57	150.7	16.13	GW1	X				
152.2	155	2.8	P4			X		
155	157.4	2.4	GW1	X				
157.4	157.7	0.3	P4, GW1	X		X		
160.7	161.1	0.4	P4			X		
163.44	163.56	0.12	GW1, R4, SW1	X	X			X
163.67	163.86	0.19	GW1, R4	X				X
163.92	164.04	0.12	P5, GW1, R4, SW1	X	X	X		X
164.04	164.1	0.06	P5, GW1	X		X		
164.1	164.17	0.07	P5, GW1, R4, SW1	X	X	X		X
164.17	164.91	0.74	P5, GW1	X		X		
164.91	165	0.09	P5, R4, SW1		X	X		X
165	167	2	P5			X		
167	167.34	0.34	P5			X		

Begin Mile	End Mile	Length (mile)	Sensitivity Factors	Drinking Water		Human Population	Sensitive Species	Recreation
				Ground Water	Surface Water			
167.34	167.52	0.18	P5, R4			X		X
167.52	168.08	0.56	P5			X		
168.08	168.27	0.19	P5, R4			X		X
168.27	168.39	0.12	P5			X		
168.39	168.89	0.5	P5, R4			X		X
168.89	170.5	1.61	P5			X		
170.5	171.6	1.1	P5, GW2, S1, R5	X	X	X	X	X
171.6	173	1.4	GW2, S1 R5	X	X		X	X
173	173.5	0.5	P6, GW2, S1 R5	X	X	X	X	X
173.5	174.61	1.11	GW2, S1, SW2, R5, P6	X	X	X	X	X
174.61	174.73	0.12	GW2, S1, SW2, R5, P6	X	X	X	X	X
174.73	175	0.27	GW2, S1, SW2, R5, P6	X	X	X	X	X
175	177.9	2.9	GW2, S1, SW2, R5, P6	X	X	X	X	X
177.9	178.4	0.5	GW2, S1, SW2, R5	X	X		X	X
178.4	179.51	1.11	P6			X		
179.51	179.89	0.38	P6, R6, S1, SW2, GW2	X	X	X	X	X
180.2	180.26	0.06	P6, R6, S1, SW2, GW2	X	X	X	X	X
180.26	180.5	0.24	P6			X		
180.86	181.01	0.15	P6, R6, S1, SW2, GW2	X	X	X	X	X
181.01	181.94	0.93	P6			X		
181.94	182.12	0.18	P6, R6, S1, SW2, GW2	X	X	X	X	X
182.12	182.25	0.13	P6, R6, S1, SW2, GW2	X	X	X	X	X
182.25	182.37	0.12	P6			X		
182.37	182.68	0.31	P6, R6, S1, SW2, GW2	X	X	X	X	X
182.68	182.8	0.12	P6			X		
184.73	184.86	0.13	R6, SW2		X			X
185.42	185.79	0.37	R6, SW2		X			X
187.53	187.65	0.12	R6, SW2		X			X
189.46	189.58	0.12	R7, SW3		X			X

Begin Mile	End Mile	Length (mile)	Sensitivity Factors	Drinking Water		Human Population	Sensitive Species	Recreation
				Ground Water	Surface Water			
190.08	190.2	0.12	R7, SW3		X			X
190.26	190.39	0.13	R7, SW3		X			X
191.38	191.44	0.06	R7, SW3		X			X
192.19	192.25	0.06	R7, SW3					X
192.63	192.94	0.31	R7					X
192.94	193.3	0.36	R7, SW3		X			X
193.3	193.43	0.13	R7					X
193.68	194.18	0.5	R8					X
194.5	196.1	1.6	R8					X
196.1	196.29	0.19	R8, SW3		X			X
196.29	197	0.71	R8					X
197.29	197.53	0.24	R8, SW3		X			X
198.16	198.28	0.12	R8, SW3		X			X
198.59	198.96	0.37	R8, SW3		X			X
199.34	199.46	0.12	R8, SW3		X			X
201.26	201.39	0.13	R8, SW3		X			X
201.88	202.13	0.25	R8, SW3		X			X
202.26	202.63	0.37	R8, SW3		X			X
203.13	203.44	0.31	R8, SW3		X			X
204.93	205.18	0.25	R8, SW3		X			X
205.98	206.05	0.07	R8, SW3		X			X
206.23	206.36	0.13	R8, SW3		X			X
207.91	208.04	0.13	R8, SW3		X			X
209.22	209.34	0.12	R8, SW3		X			X
209.84	209.97	0.13	R8, SW3		X			X
211.45	211.64	0.19	R8, SW3		X			X
212.82	212.88	0.06	R8, SW3		X			X
213.19	213.44	0.25	R8, SW3		X			X
228.66	229.27	0.61	SW3		X			
229.27	229.39	0.12	R8, SW3		X			X
229.39	229.66	0.27	SW3		X			
230.34	230.4	0.06	SW3		X			
230.72	230.9	0.18	SW3		X			
233.08	233.32	0.24	R9, SW3					X
234.75	234.91	0.16	R9, SW3					X
236.56	236.78	0.22	R9, SW3					X
240.22	240.35	0.13	SW4		X			
247.74	247.93	0.19	SW4		X			
247.99	248.55	0.56	SW4		X			
248.8	248.86	0.06	SW4		X			
249.73	250.1	0.37	SW4		X			

Begin Mile	End Mile	Length (mile)	Sensitivity Factors	Drinking Water		Human Population	Sensitive Species	Recreation	
				Ground Water	Surface Water				
250.16	250.47	0.31	SW4		X				
254.82	255.07	0.25	SW4		X				
255.94	256	0.06	SW4		X				
257.81	258.06	0.25	SW4		X				
259.92	260.1	0.18	SW4		X				
262.09	262.16	0.07	R10, SW4		X			X	
263.46	263.59	0.13	R10, SW4		X			X	
263.65	264.89	1.24	R10, SW4		X			X	
265.82	266.13	0.31	SW4		X				
266.69	266.82	0.13	SW4		X				
267.75	267.94	0.19	SW4		X				
269.49	269.55	0.06	SW4		X				
271.23	271.41	0.18	SW4		X				
275.76	275.96	0.2	SW4		X				
276.37	276.77	0.4	R11, SW4		X			X	
315.88	316	0.12	SW5		X				
324.05	324.42	0.37	SW5		X				
334.11	334.3	0.19	SW5		X				
341	346	5	GW3	X					
356	361	5	GW4	X					
		0	No longer rated sensitive for ground water contamination						
423	428	5	GW5	X					
		0	No longer rated sensitive for ground water contamination						
525.31	525.49	0.18	S2, R12				X	X	
526.48	526.88	0.4	S2, R12				X	X	
Total Miles		110.46		52.9	21.5	50.2	9.7	26.5	

NOTE: **Bolding indicates changes from original Table 7.1-1 in the draft EA**

P Population Sensitive

P1 Houston Metropolitan Area

P2 Austin County

P3 Bastrop County

P4 Eastern Travis County

P5 Austin Metropolitan Area

P6 Western Travis County

GW Ground Water Sensitive –Potential Impacts to Public Drinking Water Supply Wells

- GW1 Colorado River Alluvium – Bastrop County wells, Aqua Water Supply Corporation
- GW2 Edwards Aquifer – Balcones Fault Zone (BFZ) – Sunset Valley Wells
- GW3 Edwards-Trinity Aquifer – City of Eldorado PWS wells and known karst features within 2.5 miles
- GW4 Edwards-Trinity Aquifer – PWS wells 2.5 miles north
- GW5 Edwards-Trinity Aquifer – Upton County Water District wells within 2.5 miles south of pipeline
- S Sensitive Species Sensitive – Potential Impacts to Federally Listed Threatened and Endangered Species**
- S1 Karstic terrain in South Austin – highly sensitive for impacts to Barton Springs Salamander
- S2 Pecos River crossing – sensitive for Pecos Pupfish
- R Recreational Sensitive – Potential Impacts to Public Recreational Facilities**
- R1 Houston Area Public Parks
- R2 Crossing of Clear Creek and Brazos River
- R3 Buescher State Park, crossing of Hunt Branch above Buescher Lake
- R4 Crossings and sensitive watersheds for Marble Creek, Onion Creek, and Boggy Creek, upstream of McKinney Falls State Park
- R5 Crossings of Edwards Aquifer, BFZ with potential flow to Barton Springs and Cold Springs
- R6 Barton Creek and watershed, with potential flow to Barton Springs and Cold Springs
- R7 Unnamed Stream and Flat Creek watersheds, which contribute to Pedernales upstream of Westcave Preserve
- R8 Portions of Pedernales River watershed rated for sensitivity to Pedernales Falls State Park and Westcave Preserve, Pedernales Falls State Park
- R9 Portions of Sandy Creek watershed rated for sensitivity to Enchanted Rock State Natural Area
- R10 James River watershed and crossing
- R11 Llano River Crossing
- R12 Pecos River and Tributary
- SW Surface Water Sensitive – Potential Impacts to Public Drinking Water Supplies**
- SW1 Marble Creek and Onion Creek crossings in Colorado Alluvium
- SW2 Barton Creek watershed upstream of City of Austin Green water treatment plant
- SW3 Pedernales watershed rated for sensitivity to Highland Lakes drinking water quality
- SW4 Llano River watershed rated for sensitivity to Highland Lakes drinking water quality
- SW5 San Saba watershed 60 miles upstream of alluvial public water supply wells

Revised Table 4-14
Estimated Hydrogeologic Sensitivity and Proximal Sensitivity
(Sensitivity of Public Water Supply Receptors) in the Vicinity of the
Longhorn Pipeline System Route

Starting Mileage	Ending Mileage	Hydrogeologic Unit	Hydrogeologic Sensitivity	Proximal Sensitivity	Total Sensitivity Sum A+B	Previous Sensitivity and Justification	Changes Made
0	59.8	Gulf Coast Aquifer System	4	5	9	Not Sensitive – Deep Soil Formation with surface clays	
59.8	66.0	Brazos River Alluvium	3	5	8	Sensitive – Unconsolidated Alluvium	
66.0	80.9	Gulf Coast Aquifer System	5	5	10	Not Sensitive – Deep Soil Formation with surface clays	
80.9	81.2	Brazos River Alluvium	3	5	8	Sensitive – Unconsolidated Alluvium	
81.2	88.9	Gulf Coast Aquifer System	4	5	9	Not Sensitive – Deep Soil Formation with surface clays	
88.9	91.0	Brazos River Alluvium	3	5	8	Sensitive – Unconsolidated Alluvium	
91.0	98.6	Gulf Coast Aquifer System	4	5	9	Not Sensitive – Deep Soil Formation with surface clays	
98.6	99.0	Colorado River Alluvium	3	5	8	Sensitive – Unconsolidated Alluvium	
99.0	111.5	Gulf Coast Aquifer System	4	5	9	Not Sensitive – Deep Soil Formation with surface clays	
111.5	112.5	Colorado River Alluvium	3	5	8	Sensitive – Unconsolidated Alluvium	
112.5	118.6	No major or minor aquifer outcrops present	5	5	10	Low Sensitivity– Deep Clayey soil formation	
118.6	119.7	Colorado River Alluvium	3	5	8	Sensitive – Unconsolidated Alluvium	
119.7	122.1	No major or minor aquifer outcrops present	5	5	10	Low Sensitivity – Deep Clayey soil formation	
122.1	123.1	Colorado River Alluvium	3	5	8	Sensitive – Unconsolidated Alluvium	
123.1	125.6	No major or minor aquifer outcrops present	5	5	10	Low Sensitivity – Deep Clayey soil formation	
125.6	127.5	Colorado River Alluvium	3	3	6	Sensitive – Unconsolidated Alluvium	Decrease Proximal Sensitivity to 3 bringing overall score to 6
127.5	128.9	Sparta Aquifer Outcrop	3	3	6	Moderate Sensitivity – Deep sandy soil formation High density of water supply wells nearby	Decrease Proximal Sensitivity to 3 bringing overall score to 6

Starting Mileage	Ending Mileage	Hydrogeologic Unit	Hydrogeologic Sensitivity	Proximal Sensitivity	Total Sensitivity Sum A+B	Previous Sensitivity and Justification	Changes Made
128.9	141.5	Colorado River Alluvium partially overlying Queen City Aquifer	3	3	6	Sensitive – Unconsolidated Alluvium High Density of water supply wells nearby	Decrease Proximal Sensitivity to 3 bringing overall score to 6
141.5	142.2	Carrizo-Wilcox Aquifer outcrop	3	3	6	Moderate Sensitivity – Deep Sandy Soil Formation AWSC wells within 2.5 mi.	Decrease Proximal Sensitivity to 3 bringing overall score to 6
142.2	143.2	Colorado River Alluvium	3	3	6	Sensitive – Unconsolidated Alluvium AWSC wells within 2.5 mi.	Decrease Proximal Sensitivity to 3 bringing overall score to 6
143.2	150.7	Carrizo-Wilcox Aquifer outcrop	3	3	6	Moderate Sensitivity – Deep sandy soil formation AWSC wells within 2.5 mi.	Decrease Proximal Sensitivity to 3 bringing overall score to 6
150.7	157.4	No major or minor aquifer outcrops present	5	5	10	Not Sensitive – Deep clayey soil	
157.4	157.7	Colorado River Alluvium	3	3	6	Sensitive – Unconsolidated Alluvium High density of water supply wells nearby	Decrease Proximal Sensitivity to 3 bringing overall score to 6
157.7	163.6	No major or minor aquifer outcrops present	5	5	10	Not Sensitive – Deep Soil	
163.6	164.9	Colorado River Alluvium	3	3	6	Onion Creek watershed – PWS wells downstream at confluence with Colorado River	
164.9	170.5	None	5	5	10	Upper Confining unit of Edwards (BFZ) Aquifer	
170.5	170.6	Edwards Aquifer (BFZ)	2	2	4	Sensitive – Karst area	
170.6	171.2	Edwards Aquifer (BFZ) Leached and Collapsed Member	1	2	3	Hypersensitive – Karst High Permeability Unit	
171.2	171.5	Edwards Aquifer (BFZ)	2	2	4	Sensitive – Karst area	
171.5	171.7	Edwards Aquifer (BFZ) Leached and Collapsed Member	1	2	3	Hypersensitive-Karst High Permeability Unit	
171.7	171.9	Edwards Aquifer (BFZ)	2	2	4	Sensitive – Karst area	
171.9	172.3	Edwards Aquifer (BFZ)	2	2	4	Sensitive – Regional Dense member of Person formation – near by karst features	
172.3	172.4	Edwards Aquifer (BFZ) Kirshberg Evaporite Member	1	1	2	Hypersensitive – Karst High Permeability Unit	

Starting Mileage	Ending Mileage	Hydrogeologic Unit	Hydrogeologic Sensitivity	Proximal Sensitivity	Total Sensitivity Sum A+B	Previous Sensitivity and Justification	Changes Made
172.4	172.7	Edwards Aquifer (BFZ)	2	2	4	Sensitive – Karst area	
172.7	173.1	Edwards Aquifer (BFZ) Kirshberg Evaporite Member	1	1	2	Hypersensitive – Karst High Permeability Unit	
173.1	173.5	Edwards Aquifer (BFZ)	2	2	4	Sensitive - Karst area – Dolomitic member of Kainer Formation	
173.5	199.0	Trinity Aquifer	4	4	8	Alternating clay and marl	
199.0	206.0	Ellenburger-San Saba Aquifer	2	5	7	Known karst area	
206.0	207.5	Edwards-Trinity (Plateau) Aquifer	4	5	9	Alternating clay and marl	
207.5	210.0	Ellenburger-San Saba Aquifer	2	5	7	Known karst area	
210.0	214.5	Edwards-Trinity (Plateau) Aquifer	4	5	9	Alternating clay and marl	
214.5	215.3	Ellen burger-San Saba Aquifer	2	5	7	Sensitive Karst	
215.3	224.8	Edwards-Trinity (Plateau) Aquifer	4	5	9	Alternating clay and marl	
224.8	226.2	Ellenburger-San Saba Aquifer	2	5	7	Sensitive – Karst	
226.2	244.9	Edwards-Trinity (Plateau) Aquifer	4	5	9	Alternating clay and marl	
244.9	276.6	Ellenburger-San Saba Aquifer	2	5	7	Sensitive – Karst	
276.6	281.2	Edwards-Trinity (Plateau) Aquifer	3	5	8	Low – Moderate Permeability Sandstone	
281.2	341.0	Edwards-Trinity (Plateau) Aquifer	3	4	7	Known karst area	
341.0	346.0	Edwards-Trinity Aquifer	2	1	3	City of Eldorado PWS wells < 2.5 miles north; and known karst features <2.5 miles north	
346.0	356.0	Edwards-Trinity Aquifer	3	3	6	High permeability limestone	
356.0	361.0	Edwards-Trinity Aquifer	3	2	5	PWS well 2.5 miles north	
361.0	410.0	Edwards-Trinity Aquifer	3	4	7	Known karst area	

Starting Mileage	Ending Mileage	Hydrogeologic Unit	Hydrogeologic Sensitivity	Proximal Sensitivity	Total Sensitivity Sum A+B	Previous Sensitivity and Justification	Changes Made
410.0	423.0	Edwards-Trinity Aquifer	3	5	8	City of Big Lake PWS wells within 25 miles along stream in karst area and known karst feature within 2.5 miles of pipeline	Big Lake is now supplied by Reagan County Fresh Water Supply District (FWSD), produced from Antlers Aquifer.
423	428	Edwards-Trinity Aquifer	2	2	4	Upton County Water District Wells within 2.5 miles south of pipeline	
428.0	446.8	Edwards - Trinity (Plateau) Aquifer	3	5	8	Limestones and Sandstones – Moderate permeability	Incorrectly listed as proximal sensitivity 3 in EA. No PWS proximal.
446.8	492.0	Cenozoic Pecos Alluvium	3	5	8	Unconsolidated Alluvium	
492.0	495.0	Cenozoic Pecos Alluvium	3	5	8	City of Grand Falls PWS wells within 2.5 miles south	Wells in Pecos Alluvium closed as of October 1996. Now acquires water from Colorado River Municipal Water District.
495.0	508.7	Cenozoic Pecos Alluvium	3	5	8	Unconsolidated Alluvium	
508.7	516.7	None	5	5	10	No aquifers present	
516.7	565.5	Cenozoic Pecos Alluvium & Edwards Trinity (Plateau) Aquifer	3	5	8	Unconsolidated alluvium and sandstone	
565.5	570.6	Rustler Aquifer Outcrop	4	5	9	Low Permeability limestones No PWS wells in proximity	
570.6	687.5	No major or minor aquifers present	4	5	9	No PWS wells in close proximity	
687.5	694.6	Hueco Bolson Aquifer	5	2	7	28 PWS wells within 2.5 miles	
*0.00	25.80	Cenozoic Pecos Alluvium	3	5	8	Unconsolidated Alluvium	
*25.80	28.00	Edwards-Trinity (Plateau) Aquifer	3	5			

* Odessa Lateral