

# The Strongest Link Integrating SCADA & GIS

2



# GARLAND

WATER UTILITIES

#### **System Numbers**



- 226,876 Population
- 86,593 water connections (TCEQ)
- 1,114 miles of water mains, ranging in size from <sup>3</sup>/<sub>4</sub>" to 48"
- 8,271 fire hydrants
- 70% of the mains are cast iron
- West zone has 3 pump stations and 2 towers
- East zone has 3 pump stations and 1 tower

#### **Business Need**





	2)														
		1000	8.005		847500	\$1400	BLOCK	1887	1000		1007			No.	
		RANE	Rentil	-	680	RAME	RADIE	÷	685		5071	RANE		080	
		A				ARAENHO RD.	3400	29	m i	47	BALLYBUNGN CR.		49	95.0	
	27	A RHE (EAST)	200	я.	1942	21	3300	214	82 7	6.		700	290	410	
	31	A AVE. (MED)	100	96	197	20	2500	2	9W	32	BAULISIOL CR. -BANCROFT DR. (EAST)	600 300	a ec	9A-W	
			1290	94.		8.	1000	ŵ.	108	49	-SANCHOFT DR. (EASI)	300	9C	10A.J.	
	.,	ABIEV CL ABERDEN DR	3100	28	8V 94.P	0	3000	96	19G	34	SANCROFT DR. (WEST)	100	90	196.1	
	01	ABION TIL	5980	-4A 22H	40.	Grändebon CREEK DR.	1800	100	194-2	3e	BANDESA LN	1332	90	199	
	24	/ ABLER INL	1000	236	-	29 AREOR TRL	3600	231	40,			800	96		
	- 20	ACORN GREEN CR.	1800	2344	40.	N/I MBORNEW DR.	900	21C	29V 29A-E	33	DANOEAD ST.	200	9,	79A.W	
	- 10	ACORN GREEN DR.	3900	23N	40.	5'S ARCHONDE.	2300	16D 16G	2044	- 22	BANG IL DARCEIONA DR.	200	18C	18A-A	
			5800	23		22 ARCHERV UN.	1800	100	185	55	SARCESCHA PL	400	28	AAIC	
	- 4	ACTION ST.	4400	130	285	63 ARENDALE CR.	1400	100	184.0	12	BARCURY UN.	6605		56.7	
	-34	ALAMOUN	1300 900	8			3790	3	196			6530	8		
		ALCAZAR CT.	800	256	44	ABADD CIE.	5530	24	114	22	MAD-CT	1300	100	29A-C	
	9		3000	24	10H	38 AIMEROND CR.	908	168 15C	29H	52	BARD DR.	1200	148	28A-C	
	- 9	ALDERWOOD DR.	7500	33	992	25 ABOWIN	1300	18C 14C	296	2\$	INFORED AVE.	1800	154. 15K	29U	
	- 7,2	ALDINGCK DR.	4200	200	40E 19A.K		1800	147				200	18		
			300	200	400		1900	160		37	BARIGER ST.	400	95	18A-W	
	20	ALLECHENY TRAL UN	300	230	2014	-20 ARROWCREST CT.	2300	2.	204		BAINGED PROPER	630	81	184	
	- 37		400	9,	194-18	20 ABROWCRETUN	4300	21.	28A 29Z			630	ØK.		
	27	ALMETA DR.	3800	16G	290	4/2. ABRONHEAD CR.	700 909	210	202	12	INVESTIGATION OF THE PARTY OF T	100	8	18Y	
	63	ALCHEDALE DR.	1800	108	19A-8	warron on the	800	210	~	11	BARON DR.	3000	Ξ.	19A.F	
		AUX CARS DR.	1000	10H 250	40.1	STASSIFY PK	600	214	294-4			2900	10A		
	7.0	AUX UNADIA.	0000	251	-400		500	220		42	BASSING CIR.	790	218	292	
	9	AUMP DR	3700	26	195	ASHBROOK UN	2000	10C	39A-N	34	BAY BLAND DR.	6300	26	35A-X	
	- <i>Sà</i>	ALTO DR.	300	104	29A-E	NØ ASHOLEN DR.	2000	230	45	10	MV SHORE OR.	400	240	19461	
			-800	16D		26 ADMINIOR	200	194	28	50	INV SHORE DR.	1300	109	199,6-1	
		AMERWAY UN. (EAST)	3000	108	19A-0 19A-J		3900	194	290			1800	101		
			300	÷.	1994	41 ADMALLE DR.	4000	210		28	BAY YEN	25000	228	304	
	-35	AMERINAL DATES	200	90	1044	37 ASHMOOD DR	200	166	29,	w.	847 WK	500	10K	29A-C	
			500	90	19A-E	20 ASPOILN	2100	2.	1.07	÷	BAYGERRY UN.	4100	200	302	
	. 3	AMHERSF DR.	4100	71.	187	1.5 ADDET IT	3000	140	280	12	SWPORT DR.	4000	200	400	
		AMIY AVE.	3900 3900	164	28A.V	FLS ASTROR	500	238	284-1			2800	155	258	
	54	AN/ECLE CT	2900	10H	25A.P		400	225	384.0	12.	IEALS WY.	4500	23	404	
	- 82	ANCHOR B// DR	5800	246	454-4	YE ALANIA CEL	1103	218	29U 20U			4000	245		
	83	ANCHOR COVE CR.	5330	260	40A-E	25 ALANGA DR. 25 ALBURN ST.	1200	210	290	10	BEAVER RUN	2400	80	181.	
	1	ANCELA DR. ANDOV/FR DR.	4200	76	18N 291	ALGUERA DR.	4000	210	294 .	5	INCRET CT.	2900	20	82	
		ANDOVER DR. ANDREA LN.	1800	41	291 18A.F	Se ALENGA CP.	3680	2.	125	Ge.	HEORY CX	3100	29	88	
	18	remaining and	2200	154		39 AL6114 ST.	1200	92	194	ú.	BELINDA CE.	1330	108	25A-C	
	21	ANGEL FRE DR.	1900	2	29E		900	96	102 10A-W	招	HELKA DIL	3000	150	290	
			1900	10	19 <b>A</b> -V	64 MALCH DR.	100	9L 22C	10A-W 30W	먨	HELLA DR. BRUARE DR.	400	157	29H 19D	
	. 69	ANGLE REGE CR.	700	235	45A 200		#100	225		37	HELMOCK UNER	2,600	120	194-14	
	24	ANSA DR. ANSA DR.	3000 400	180 96	2942 1997	24 MICH DR.	2580	150	294		BRLEINE CE	5200	a	56.W	
		ANNETTE CI.	300	28	80			199		31	RELIMENCE DR.	330	а.	194-5	
		ANIARS CR.	2900	2K	184	27 ANE DR.	2003	195	20# 266-1	끎	HELMOOD DR. BELMONT DR.	200	к.	184-E - 290	
	55	ARACHE DR.		15K	29A-U	55 AZALLA UN.	4103	224	.em		BELMONT OR.	1100	153 6A	290	
	- 59		ė00 -	28				-		•		3 2400	÷.	18.4	
		ARAUACHE DR.		-21	9W 18D	37 8.445.545	100		102	-		2400	÷.	190	
		APOLLO CT-	3000	20	180 180	2 [ 8 AN ( (AS))	100	÷.	102 10A-W		2	1 1933	64.	18	
	34	APOLLO RD.	5800	2	180	51 BANE ONERD	1400	91	125		3	1 1 2 2 2	99	19G	
			2400	2.	19.A		1003	104	104		4	600 100	9C 6F	1964 1964-J	
			1800	30	198		100	9, 1	192	47	IEN DAVIS RD59	160	2	1984-J	
			1200	ж	HIC	\$3 BACCARYODE	-5403	23	40M	× .	een ummo ritti.	1800	2	195.4	
			700 100	95 90	10H 10A-J	124 INCOMENTING	3803	270	374	03	IEN 1N	2130	ĩ.	299	
	2.0	APOLLO ED (EAST)	100	80	19A-J 18A-J	WR INCOMMEND.	3603	208 200	aat			2130	159		
	24	APPLE VALUEY DR.	3000	TOH .	254-9	21 BANKARA DR	2000	2	195	9	BENDING OAKS TEL. 17		84	29P	

- System operators had
   limited system visibility –
   pumping stations and
   elevated storage only
- Operators relied on low pressure / main break calls
- Outdate paper maps showing estimate pressure points
- We needed a NEW, more accurate and proactive approach

#### **Pressure Equation Development**



- 152 EPP (Estimated Pressure Points) locations were selected: 71 points in the East and 81 points in the West pressure plane and imported into ArcSDE
- System Average and Maximum demand day models were used to determine the facility of greatest for each point
- Ground contours were used to assign elevation for each point
- EPP equation was developed for each point and tested against hydraulic model
- Coefficient added to account for head loss based on model hydraulic grade lines
- EPP color-coded by the facility of greatest influence



## **SCADA to GIS Integration**



#### Results



# **Results**

- System operators have better visibility of pressure estimates throughout the entire distribution system
- Higher elevation vs. lower elevation customers
- More educated "pump run" decisions
- Better use of water towers (elevated storage)
- Outdate operating procedures out, more efficient operating procedures in place
- EPP is very accurate
- In house maintenance



# **Real World Application – Firewheel PS**



- January 2012 station
  shut down: lack of
  visibility and
  communication issues
  caused several low
  pressure calls and 14
  main breaks
- All available crews redirected to MB calls (40 employees)
- \$12,201 cost

## **Real World Application – Firewheel PS**



- January 2013 station shut down
- Better system visibility
- Better SOP
- No main breaks
- No low pressure calls

## **Real World Application – NEXEO Plant fire**



- November 16, 2012 around 3:30 PM
- 10,000 gallons of methanol on fire
- Initial area pressure: 45 PSI, increased to 78 PSI



#### **Real World Application – NEXEO Plant fire**





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