

# MOBILE DATA COLLECTION AND GAS UTILITY INSPECTION USING ARCPAD

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# WHY I THOUGHT THIS WOULD BE WORTHWHILE TO PRESENT

- Paper - Age old problem of paper forms is still a reality
- AMR -Not a new concept
- GIS - Show how GIS was leveraged in an area where GIS was not being used at all
- Innovation - Find innovative ways to roll out new systems – increase your GIS ROI
- Analytics - Created measurability and accountability where it wasn't previously possible

# PROBLEM – EXISTING GAS METER UPGRADE TO AMR

- 18000 gas meters
- Gas meters were manually read each billing cycle
- AMR upgrade - Automatic Meter Reading
  - Each meter needed to be touched
- Collect, inventory and catalog the condition of each meter before the upgrade
- Existing processes used paper forms

# PAPER FORM

 **Clearwater Gas System**  
**Live Greener**  
**Gas**

Date \_\_\_\_\_  
Inspector \_\_\_\_\_

Address \_\_\_\_\_ City \_\_\_\_\_

**EXISTING METER SET**                      **REQUIRED METER SET**

**meter info**                                      **meter info**

MANU \_\_\_\_\_                                      MANU \_\_\_\_\_  
SIZE \_\_\_\_\_    SIZE \_\_\_\_\_  
SER# \_\_\_\_\_    SER# \_\_\_\_\_  
YEAR \_\_\_\_\_    YEAR \_\_\_\_\_

Required Repairs \_\_\_\_\_                      Other Notes \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Regulator Info. \_\_\_\_\_                      Regulator Info. \_\_\_\_\_

MANU \_\_\_\_\_                                      MANU \_\_\_\_\_  
STYLE \_\_\_\_\_    STYLE \_\_\_\_\_  
YEAR \_\_\_\_\_    YEAR \_\_\_\_\_  
Inlet Pressure \_\_\_\_\_                                      Inlet Pressure \_\_\_\_\_  
Outlet Pressure \_\_\_\_\_                                      Outlet Pressure \_\_\_\_\_  
Orifice Size \_\_\_\_\_    Orifice Size \_\_\_\_\_  
Required repairs \_\_\_\_\_                      Other Notes \_\_\_\_\_  
\_\_\_\_\_

Riser Condition \_\_\_\_\_                      Customer Load \_\_\_\_\_

MATERIAL \_\_\_\_\_                                      Total Load (BTU) \_\_\_\_\_  
Condition \_\_\_\_\_

Required repairs \_\_\_\_\_                      Appliance List

Other Notes \_\_\_\_\_                      1 \_\_\_\_\_ BTU  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2 \_\_\_\_\_ BTU  
3 \_\_\_\_\_ BTU  
4 \_\_\_\_\_ BTU  
5 \_\_\_\_\_ BTU  
6 \_\_\_\_\_ BTU  
7 \_\_\_\_\_ BTU

# WHAT'S THE PROBLEM WITH PAPER?

- Has to be manually accounted for somehow
- No GIS
- Reduces effectiveness of the project
- Easily lost
- Double work
- Not easily measured / analytics
- Illegible

The image shows a utility form with two columns: 'EXISTING METER SET' and 'REQUIRED METER SET'. The form is filled with handwritten information in blue ink. The 'EXISTING METER SET' column includes fields for 'METER INFO' (Make: American, Style: 420, Year: 2004), 'REGULATOR INFO' (Make: National, Style: 100, Year: 2004), and 'CUSTOMER LOAD' (Total Load (BTU)). The 'REQUIRED METER SET' column includes fields for 'METER INFO' (Make, Style, Year), 'REGULATOR INFO' (Make, Style, Year), and 'CUSTOMER LOAD' (Total Load (BTU)). The form is placed on a surface with some leaves visible on the right side.

# THE APPROACH

- Needed a mobile data collection method
  - Convert the paper form to a digital form
- Needed measurably of the project
  - Project progression status
- Needed GIS
  - Meter location verification

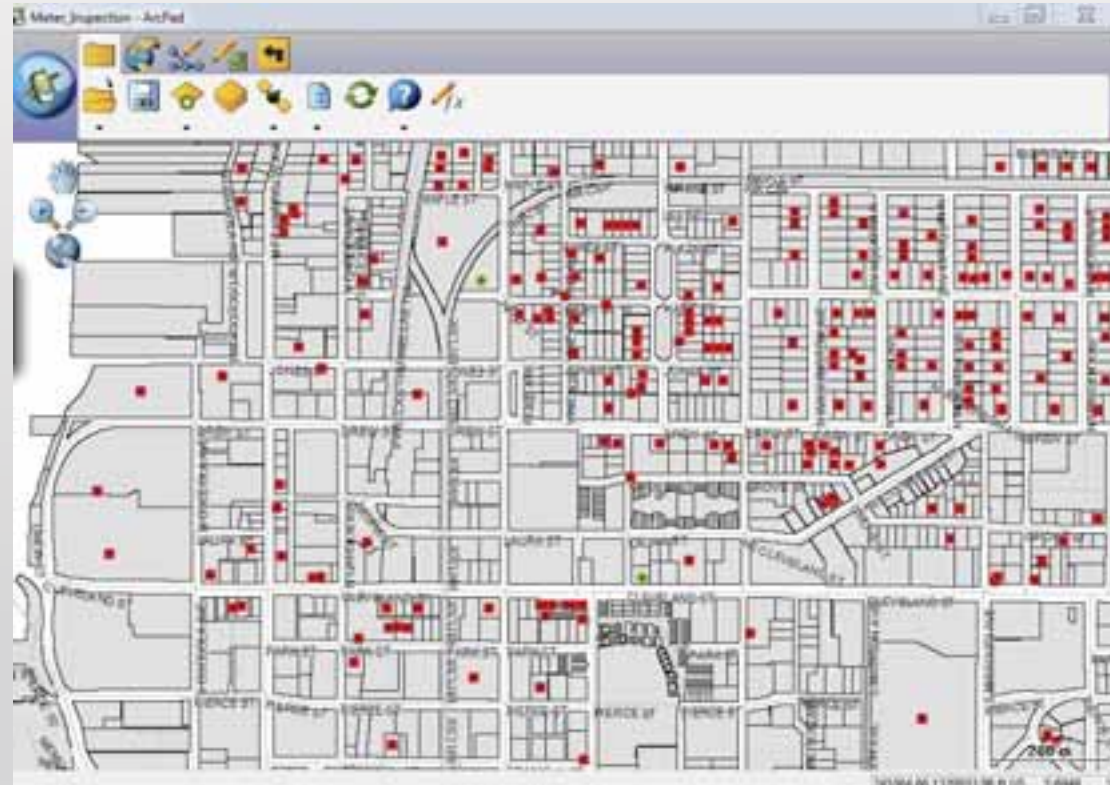
# THE HARDWARE PLATFORM - *WINDOWS BASED TABLETS*

- Full Windows 7
- Powerful scripting ability
- Easy to develop against
- Rugged
- Lots of form factor choices
  - Size
  - Connectivity
  - GPS
  - Touch Screen
  - Stylus



# THE SOFTWARE PLATFORM - *ARCPAD*

- ArcPad 10.2
- Feature Services
- Shapefiles
- Geocoded points
- GPS
- Python Scripting
  - Address validation
  - Form validation
- Pictures





Clearwater Gas System  
 Live Greener  
 Gas meter set inspection form

Date \_\_\_\_\_  
 Inspector \_\_\_\_\_

Address \_\_\_\_\_ City \_\_\_\_\_

**EXISTING METER SET**

meter info

MANU \_\_\_\_\_  
 SIZE \_\_\_\_\_  
 SER# \_\_\_\_\_  
 YEAR \_\_\_\_\_

Required Repairs

\_\_\_\_\_

\_\_\_\_\_

Regulator Info. \_\_\_\_\_

MANU \_\_\_\_\_  
 STYLE \_\_\_\_\_  
 YEAR \_\_\_\_\_  
 Inlet Pressure \_\_\_\_\_  
 Outlet Pressure \_\_\_\_\_  
 Orifice Size \_\_\_\_\_  
 Required repairs \_\_\_\_\_

Riser Condition \_\_\_\_\_

MATERIAL \_\_\_\_\_  
 Condition \_\_\_\_\_

Required repairs \_\_\_\_\_

Other Notes \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**REQUIRED METER SET**

meter info

MANU \_\_\_\_\_  
 SIZE \_\_\_\_\_  
 SER# \_\_\_\_\_  
 YEAR \_\_\_\_\_

Other Notes

\_\_\_\_\_

\_\_\_\_\_

Regulator Info. \_\_\_\_\_

MANU \_\_\_\_\_  
 STYLE \_\_\_\_\_  
 YEAR \_\_\_\_\_  
 Inlet Pressure \_\_\_\_\_  
 Outlet Pressure \_\_\_\_\_  
 Orifice Size \_\_\_\_\_  
 Other Notes \_\_\_\_\_

Customer Load

Total Load (BTU) \_\_\_\_\_

Appliance List

1	BTU
2	BTU
3	BTU
4	BTU
5	BTU
6	BTU
7	BTU

- Auto capture
- Date
- User

Gas Meter Set Inspection Form


Meter Info | Company Condition | Customer Condition | Address Search | Picture

ADDRESS: \_\_\_\_\_

Get Nearby Addresses

ok x

# FORM CONVERSION

 **meter set inspection form** Date \_\_\_\_\_  
Inspector \_\_\_\_\_

Address \_\_\_\_\_ City \_\_\_\_\_

EXISTING METER SET	REQUIRED METER SET
<b>meter info</b> MANU _____ SIZE _____ SER# _____ YEAR _____ Required Repairs _____	<b>meter info</b> MANU _____ SIZE _____ SER# _____ YEAR _____ Other Notes _____
<b>Regulator Info.</b> MANU _____ STYLE _____ YEAR _____ Inlet Pressure _____ Outlet Pressure _____ Orifice Size _____ Required repairs _____	<b>Regulator Info.</b> MANU _____ STYLE _____ YEAR _____ Inlet Pressure _____ Outlet Pressure _____ Orifice Size _____ Other Notes _____
<b>Riser Condition</b> MATERIAL _____ Condition _____ Required repairs _____ Other Notes _____	<b>Customer Load</b> Total Load (BTU) _____ Appliance List 1 _____ BTU 2 _____ BTU 3 _____ BTU 4 _____ BTU 5 _____ BTU 6 _____ BTU 7 _____ BTU

Gas Meter Set Inspection Form

Meter Info | **Com. Condition** | Customer Condition | Address Search | Picture

UMS Number: 8025209

EXISTING METER SET	WORK PERFORMED
CLASS (Priority): _____ MANU: _____ SIZE: _____ SER#: _____ YEAR: _____ REQUIRED REPAIRS: _____	PRE-FAB: NO MANU: _____ SIZE: _____ SER#: _____ YEAR: _____ OTHER NOTES: _____
<b>REGULATOR INFO</b> MANU: _____ STYLE: _____ YEAR: _____ INLET PRESSURE: _____ OUTLET PRESSURE: _____ ORIFICE SIZE: _____ REQUIRED REPAIRS: _____	MANU: _____ STYLE: _____ YEAR: _____ INLET PRESSURE: _____ OUTLET PRESSURE: _____ ORIFICE SIZE: _____ OTHER NOTES: _____

ok X

# ARCPAD – FORMS AND SCRIPTING

Gas Meter Set Inspection Form

Meter Info | Company Condition | Customer Condition | Address Search | Picture

UMS Number: 8025209

EXISTING METER SET		WORK PERFORMED	
CLASS (Priority):	<input type="text"/>	PRE-FAB:	NO
MANU:	<input type="text"/>	MANU:	<input type="text"/>
SIZE:	<input type="text"/>	SIZE:	<input type="text"/>
SER#:	<input type="text"/>	SER#:	<input type="text"/>
YEAR:	<input type="text"/>	YEAR:	<input type="text"/>
REQUIRED REPAIRS:	<input type="text"/>	OTHER NOTES:	<input type="text"/>

REGULATOR INFO	
MANU:	<input type="text"/>
STYLE:	<input type="text"/>
YEAR:	<input type="text"/>
INLET PRESSURE:	<input type="text"/>
OUTLET PRESSURE:	<input type="text"/>
ORIFICE SIZE:	<input type="text"/>
REQUIRED REPAIRS:	<input type="text"/>

ok X

Gas Meter Set Inspection Form

Meter Info | Company Condition | Customer Condition | Address Search | Picture

ADDRESS:

Get Nearby Addresses

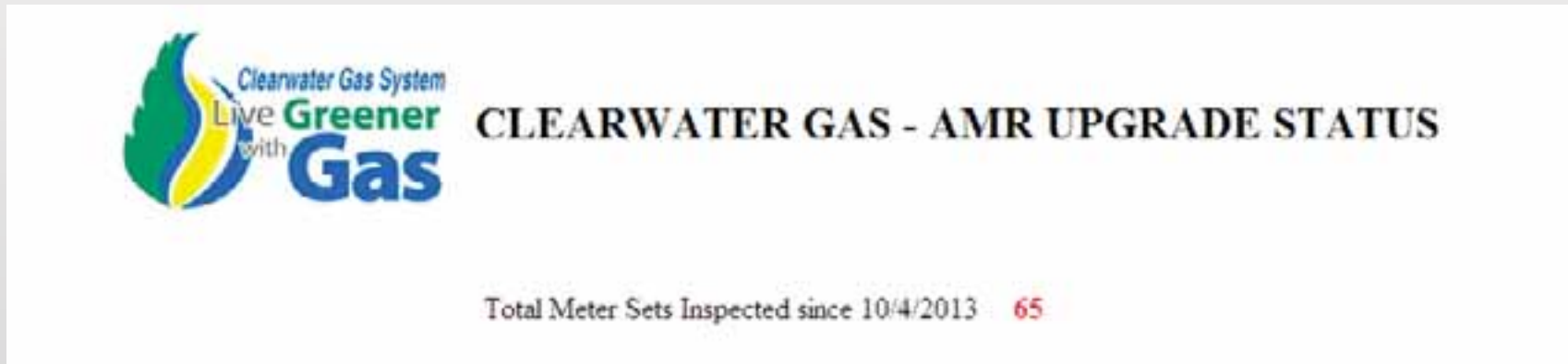
ok X

# PICTURES FROM THE FIELD



# ANALYTICS

- Web application to display the GIS data being collected in the field



# START TO GATHER METRICS

Gas Meter Set Inspection Form

Meter Info | Company Condition | Customer Condition | Address Search | Photos

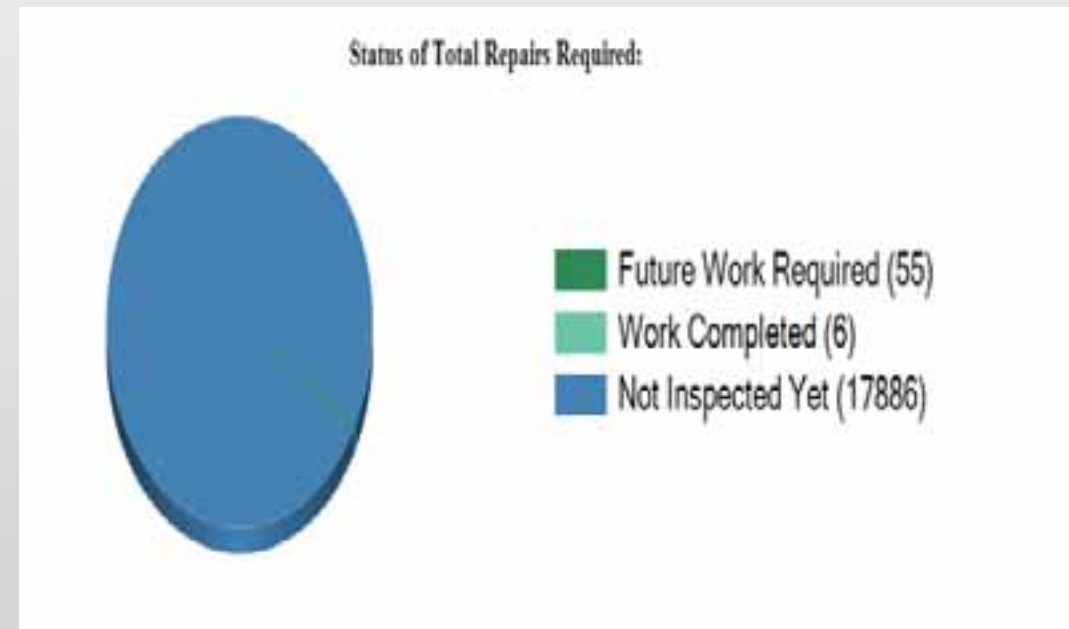
IBSR Number: 0025209

EXISTING METER SET		WORK PERFORMED	
CLASS (Priority):	<input type="text"/>	PRE-FAB:	NO
MANU:	<input type="text"/>	MANU:	<input type="text"/>
SIZE:	<input type="text"/>	SIZE:	<input type="text"/>
SER#:	<input type="text"/>	SER#:	<input type="text"/>
YEAR:	<input type="text"/>	YEAR:	<input type="text"/>
REQUIRED REPAIRS:	<input type="text"/>	OTHER NOTES:	<input type="text"/>

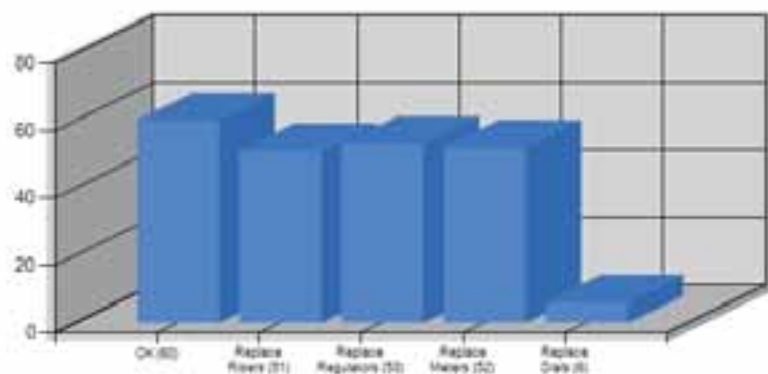
  

REGULATOR INFO		REGULATOR INFO	
MANU:	<input type="text"/>	MANU:	<input type="text"/>
STYLE:	<input type="text"/>	STYLE:	<input type="text"/>
YEAR:	<input type="text"/>	YEAR:	<input type="text"/>
INLET PRESSURE:	<input type="text"/>	INLET PRESSURE:	<input type="text"/>
OUTLET PRESSURE:	<input type="text"/>	OUTLET PRESSURE:	<input type="text"/>
ORifice SIZE:	<input type="text"/>	ORifice SIZE:	<input type="text"/>
REQUIRED REPAIRS:	<input type="text"/>	OTHER NOTES:	<input type="text"/>

ok X



**Company Riser Condition Required Repairs:**



**Customer Riser Condition Leak:**



**Meter Sets Class (Priority) Level of Total Inspected:**



**Company Riser Condition Class (Priority) Level of Material Condition:**



# WHAT WE WERE ABLE TO ACCOMPLISH WITH THIS ARCPAD SOLUTION

- No more paper
- No longer the need for double entry
- Collect pictures from the field
- Progression of project
  - Basic reporting done in a web application



# THANK YOU

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