

# NOVEC

## Third Party Attachment Project

SYST 699

Fall 2013

Matt Blanck - John O'Neill - Doug Smith

# Problem Statement

Dual-use of the utility poles with 3<sup>rd</sup> party vendors poses challenges sharing costs

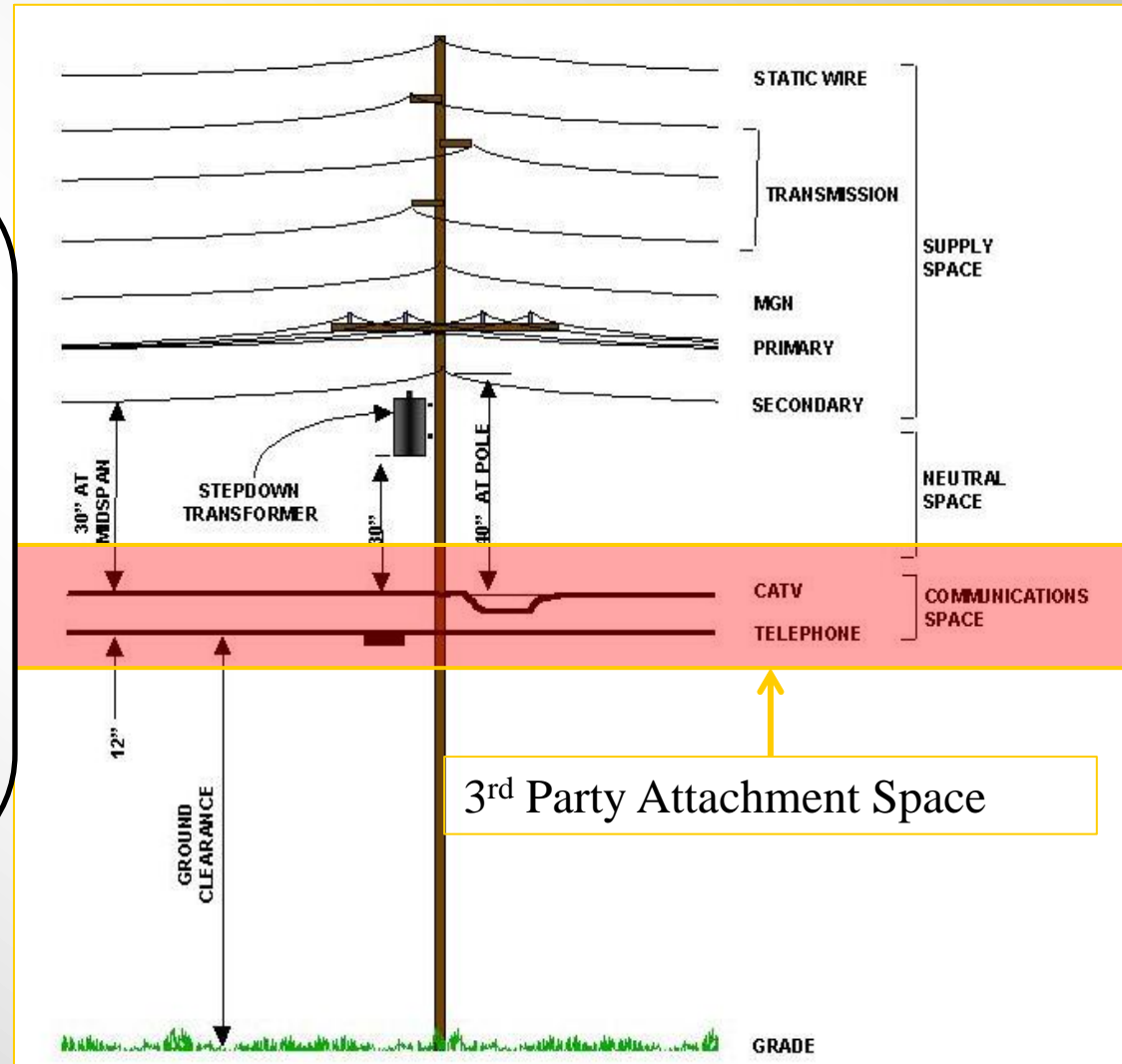
A system is desired by NOVEC to efficiently recapture shared costs

The objective is to improve cost recapture through improved tracking of 3<sup>rd</sup> party attachments

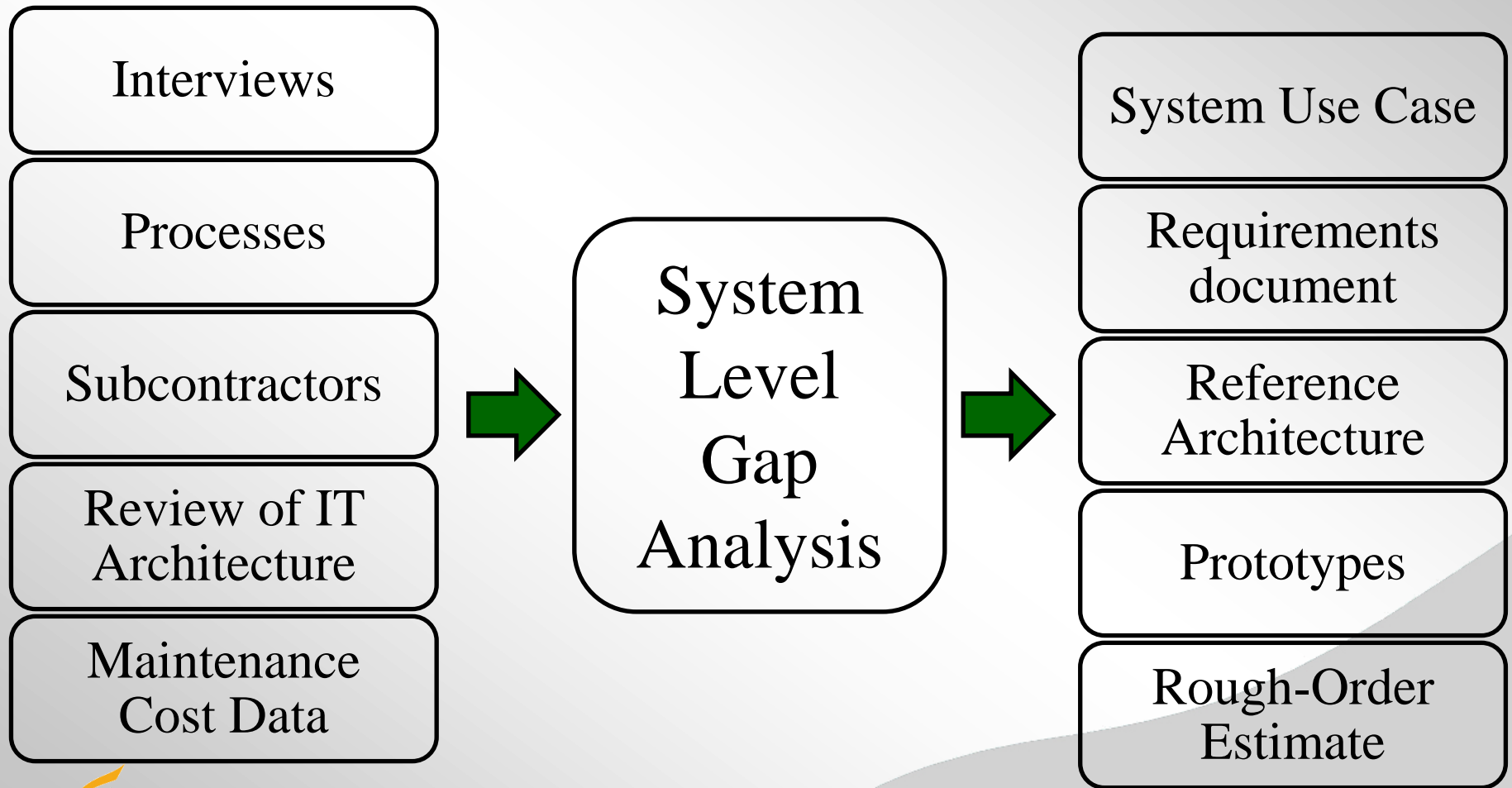


# What is a 3<sup>rd</sup> Party Attachment?

Telecommunications or cable equipment that occupies space on a power utility's pole



# Approach

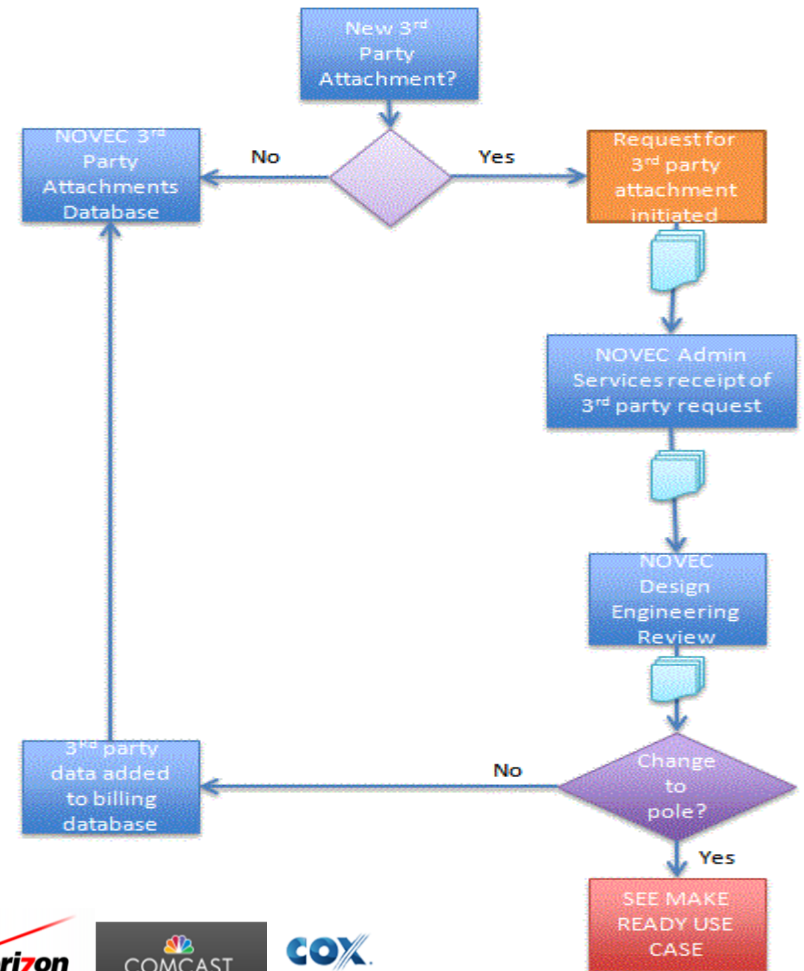


# NOVEC Permit Application Process

Process is paper based

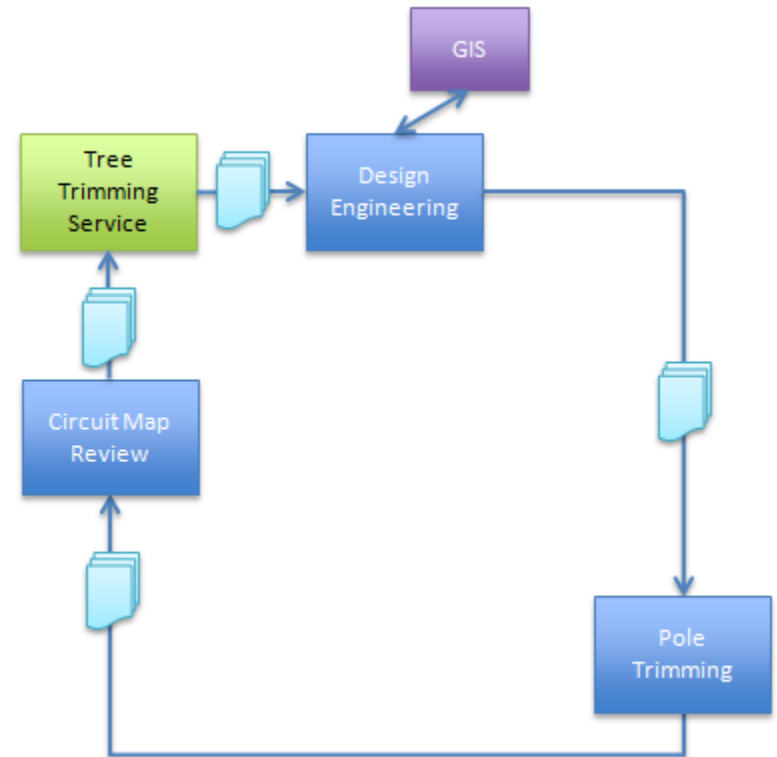
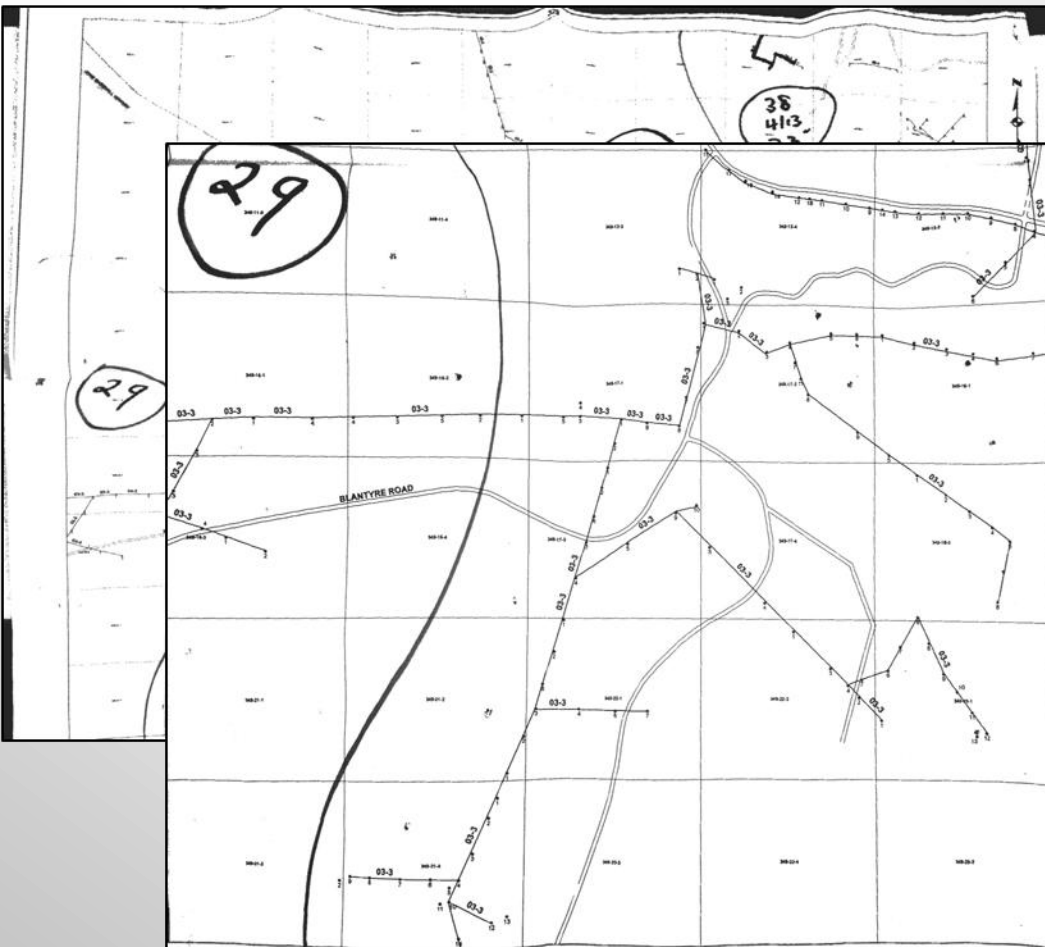
Take up to 9 months with a 3 month average

The image shows two sample forms from the NOVEC permit application process. The top form is titled "JOINT USE NOTIFICATION AND REQUEST" and contains fields for "TO", "ELECTRIC CO.", "TELEPHONE CO.", "CATV CO.", "DATE", and "COMPANY". It also has checkboxes for "NOTICE IS HEREBY GIVEN" and "REQUEST IS HEREBY MADE". The bottom form is titled "POLE INVENTORY" and contains fields for "FIELD POLE #", "INVENTORY DATE", "INVENTORY BY", "JURISDICTION", "LOWEST NOVEC ATTACHMENT", "RECOMMENDATIONS", "CATV", "TELE", "POWER", "FIBER OPTIC", "CATV NAME", "CATV BOTTOM", "CATV TOP", "NO. OF CABLES", "TELE NAME", "TELE BOTTOM", "TELE TOP", "NO. OF CABLES", "OTHER", "OTHER BOTTOM", "OTHER TOP", "NO. OF CABLES", "SURVEYED", "DATE", "CLEARANCE OK", "CATV CO ATTACH AT NOVEC OFFICE", "DATA ENTRY", and "MID SPAN VIOLATION".



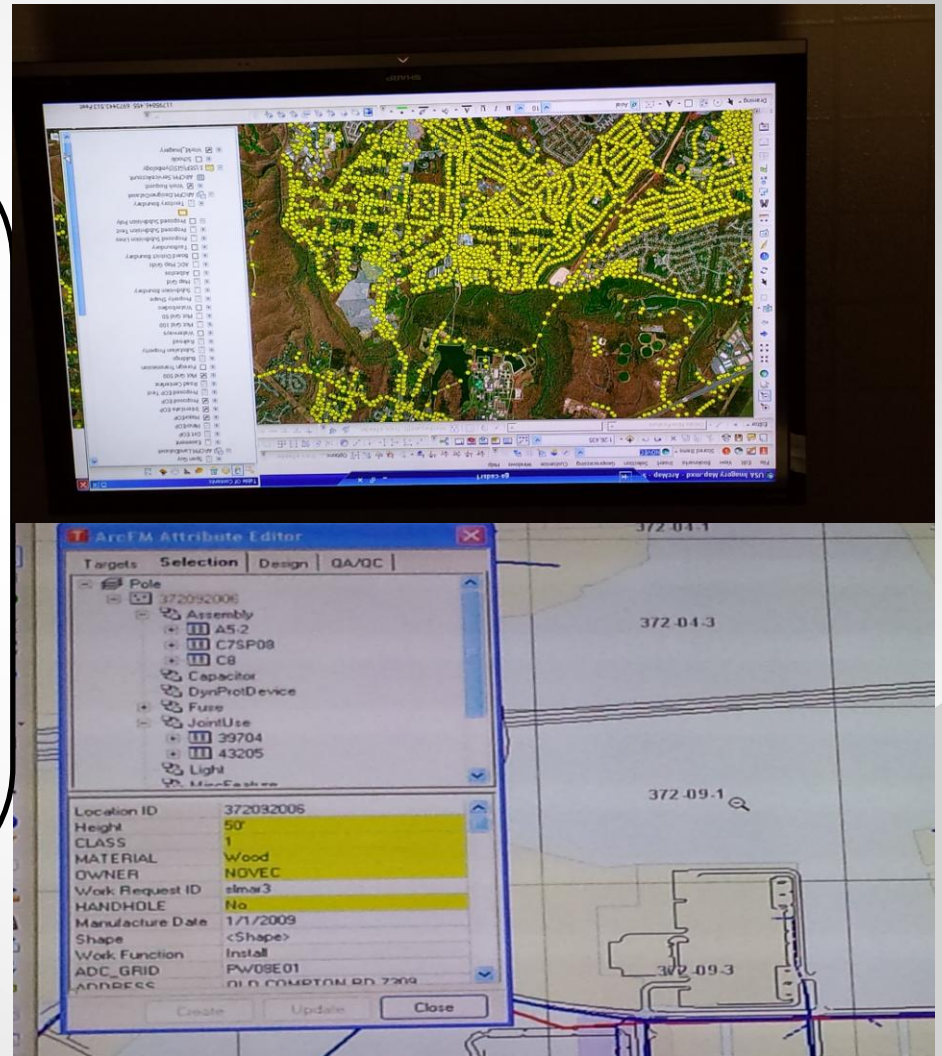


# NOVEC Tree-Trimming Process



# NOVEC ArcFM System

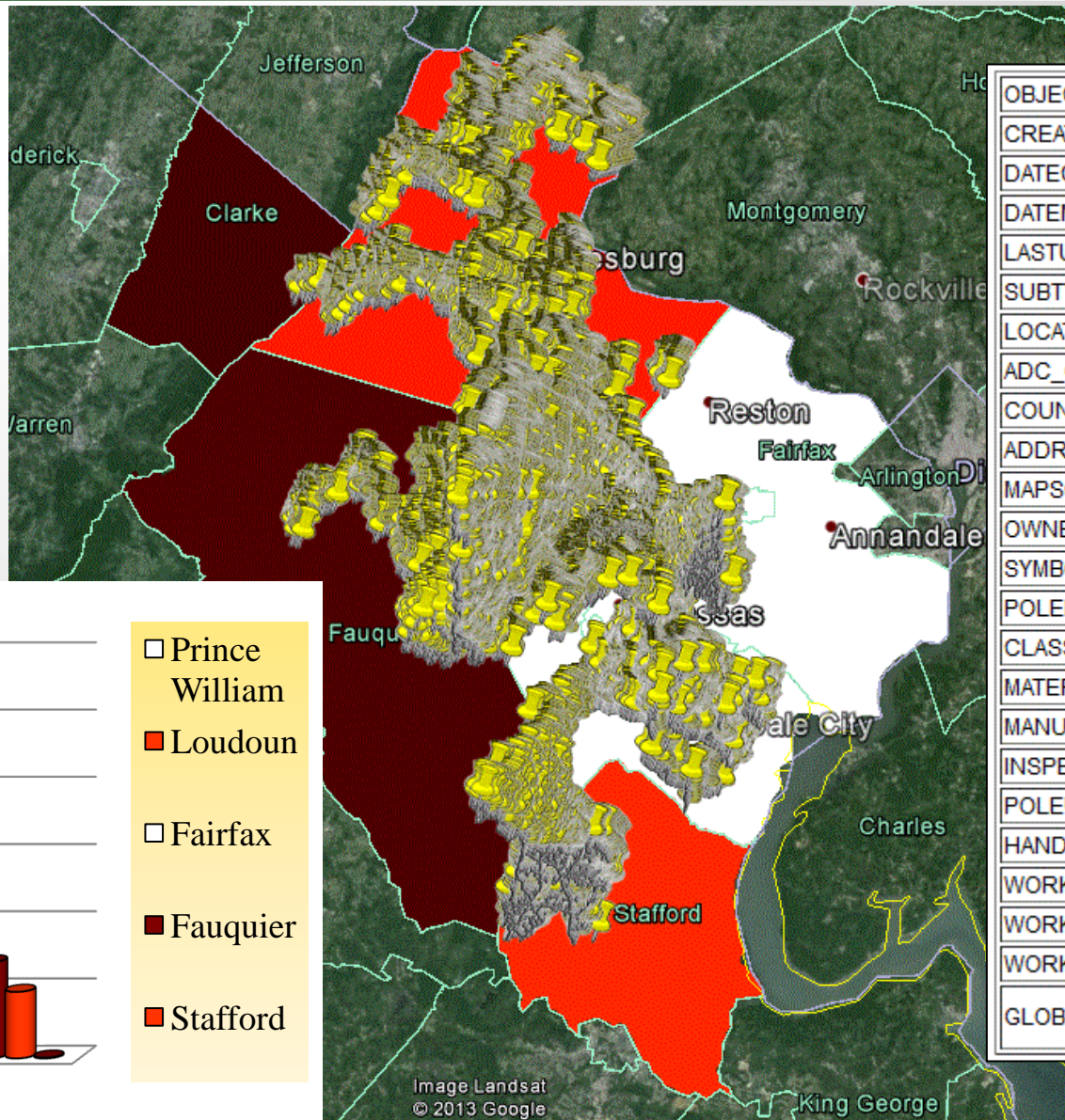
NOVEC uses the Schneider Electric ArcFM™ Solution Suite, an extension of Esri's ArcGIS® platform to model, design, maintain and manage utility infrastructure



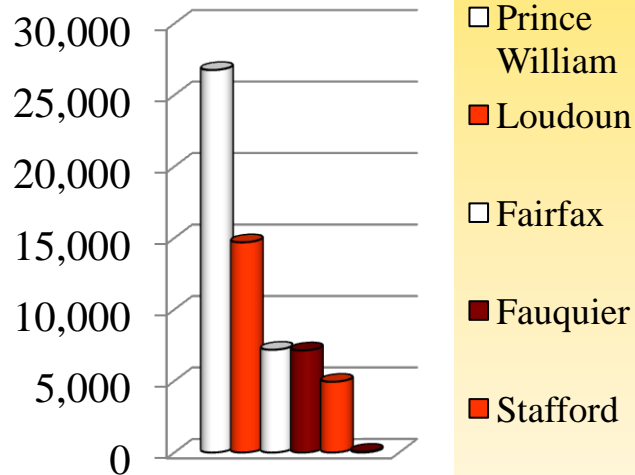


# NOVEC Utility Poles by County and Population

- Pop. > 800 ppsm
- Pop. > 300 ppsm
- Pop. < 100 ppsm



OBJECTID	4902
CREATIONUS	01T1-3
DATECREATE	2006/04/01
DATEMODIFI	2012/02/10
LASTUSER	slenhar
SUBTYPECOD	1
LOCATIONID	475242002
ADC_GRID	PW23J01
COUNTY	Prince William
ADDRESS	TURKEY RUN RD 5475
MAPSCALE	500
OWNER	NOVEC
SYMBOLROTA	0.00000000
POLEHEIGHT	35
CLASS	5
MATERIAL	Wood
MANUFACT_1	1972/01/01
INSPECTION	2012/01/17
POLEUSE	DU
HANDHOLE	N
WORKREQUES	slfeb10
WORKFLOWST	0
WORKFUNCTI	0
GLOBALID	{9BA97E46-257C-42E7-9BAD-841EFE67B56B}





# NOVEC Ten Year Survey



Survey 2010-  
2012:

22 Months

\$427,000

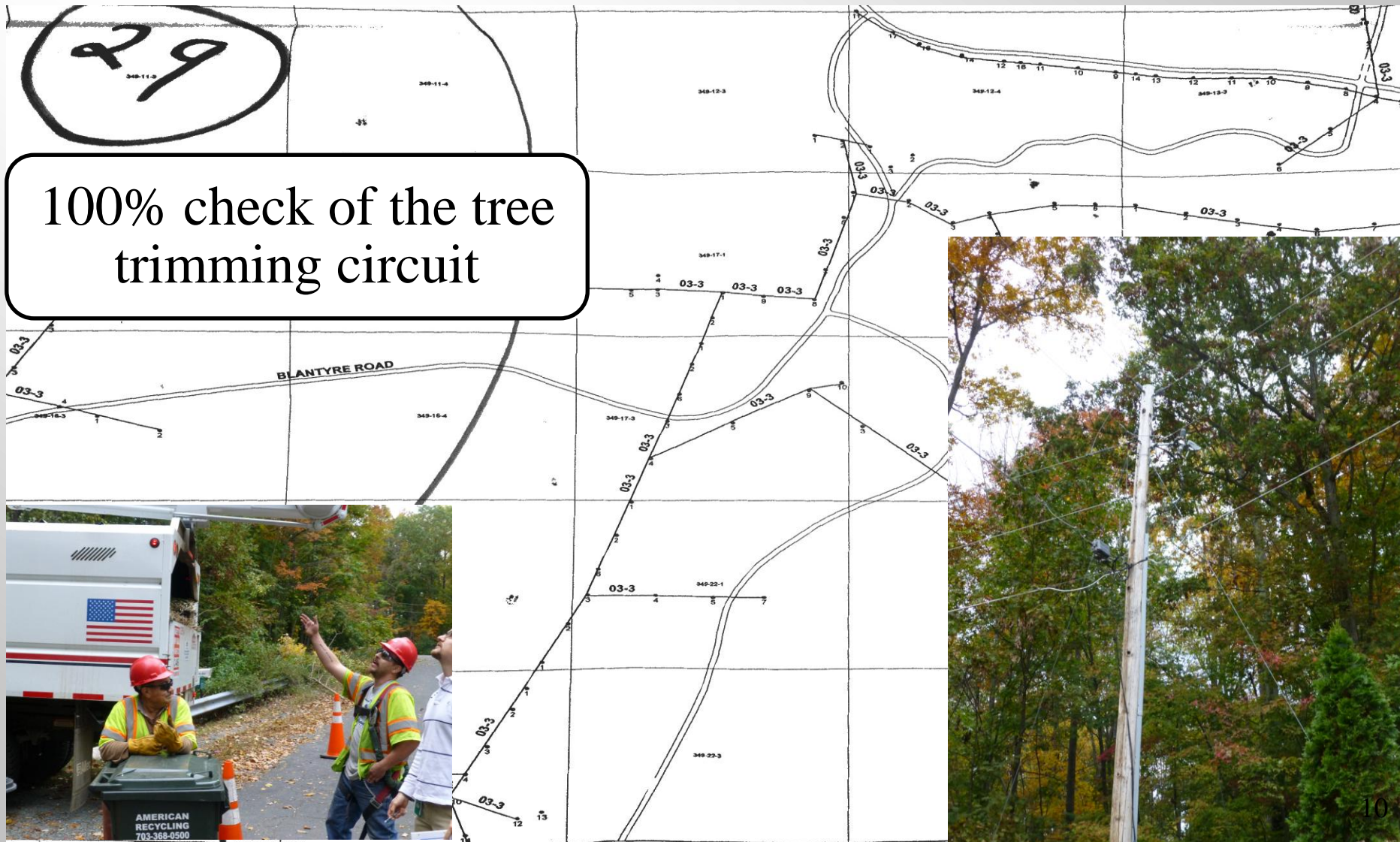
## DRG SOLUTIONS

DRG collects attachment counts, IDs attachment owners, inspects for safety violations, and completes the data collection process.

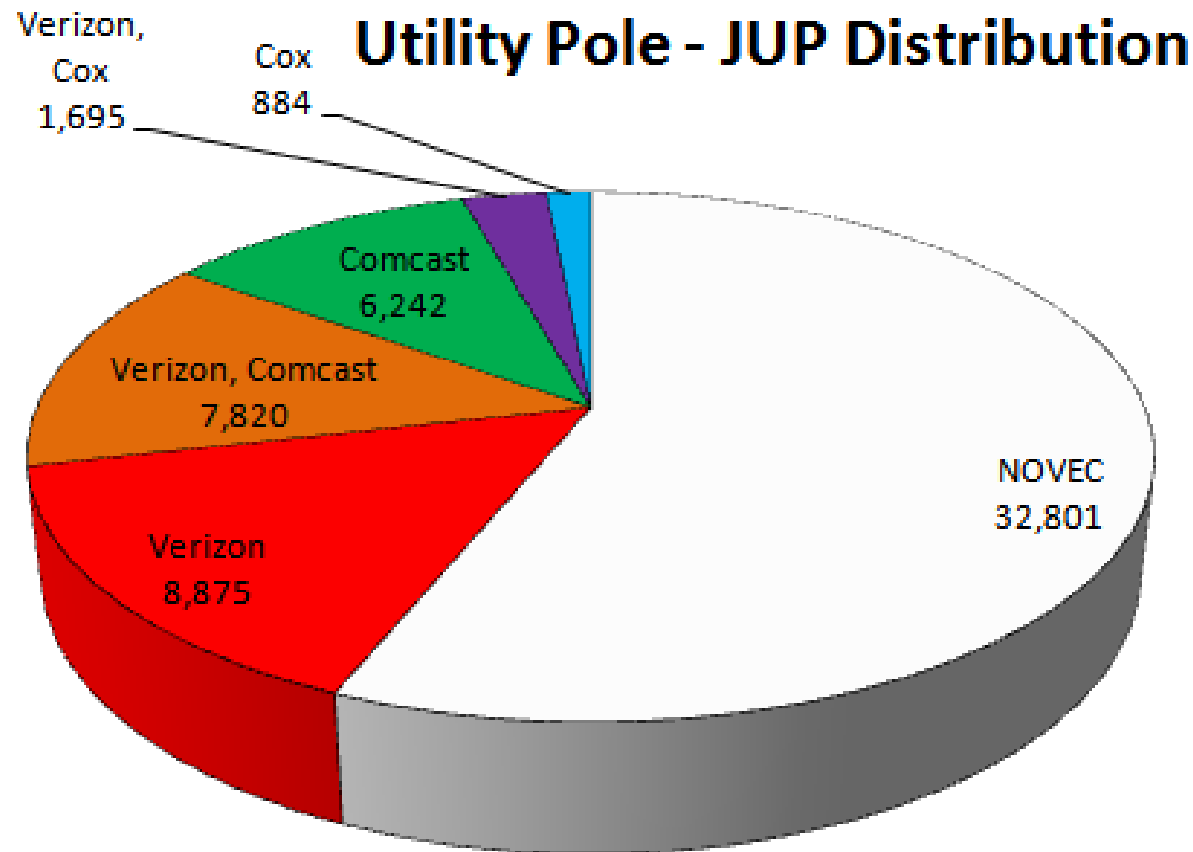


# Gap Analysis Findings

100% check of the tree trimming circuit



# Gap Analysis Findings

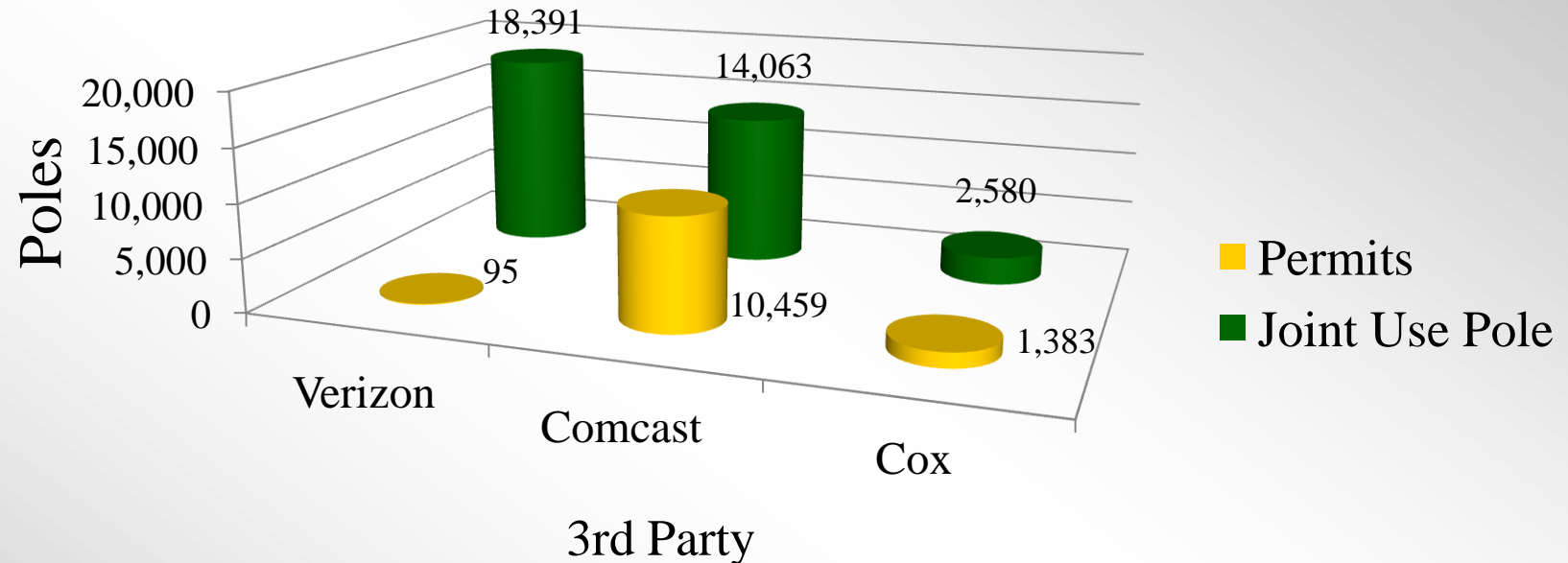


NOVEC Only  
56%  
Joint Use Poles (JUP)  
44%

- NOVEC
- Verizon
- Verizon, Comcast
- Comcast
- Verizon, Cox
- Cox

# Gap Analysis Findings

## Distribution of JUP and Permits



2010-2012 NOVEC Pole Survey:  
Data shows that only 34% have Permits



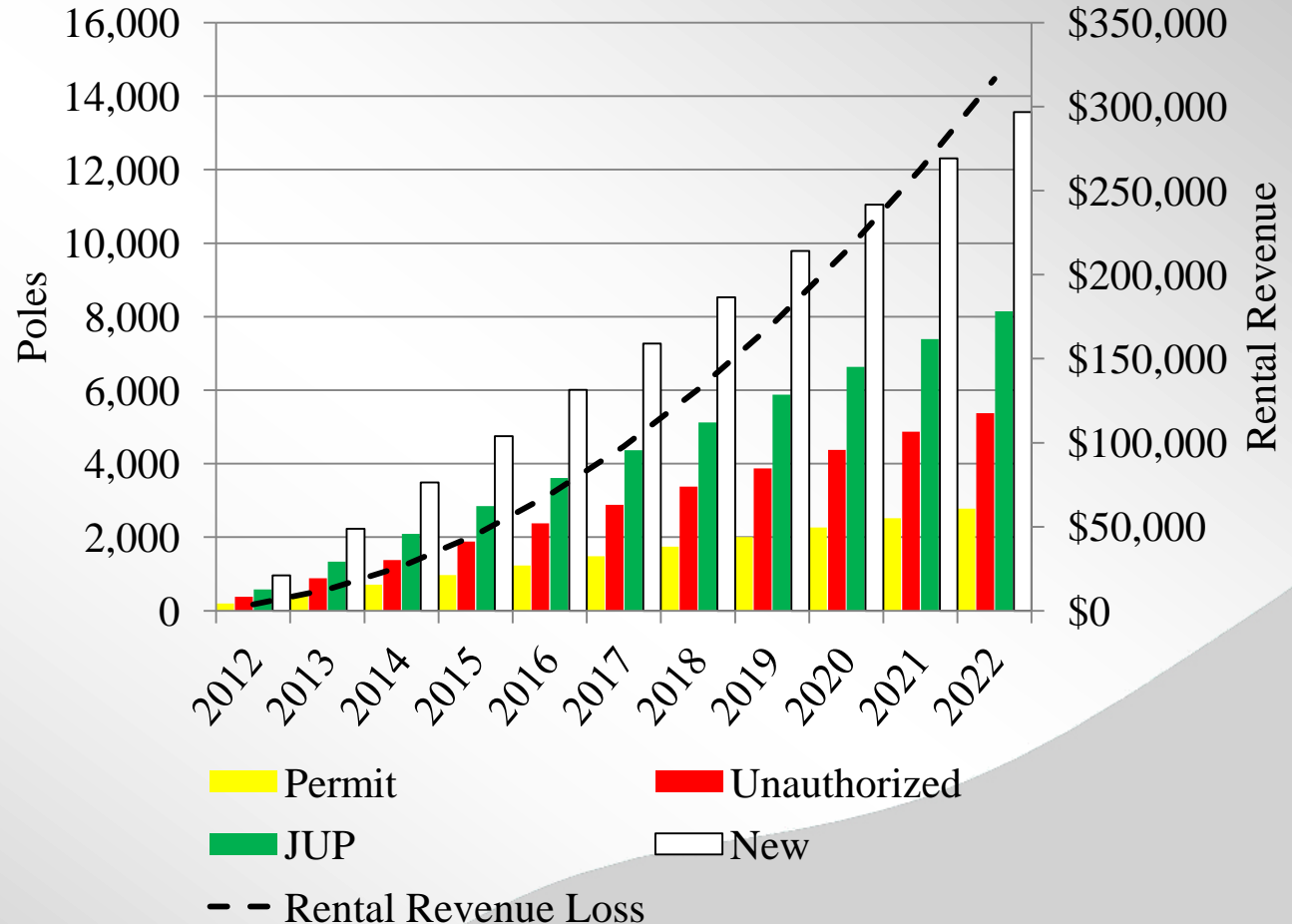
# Gap Analysis Findings

## Trend Analysis

~1260 New Poles  
/ Yr

Make-Ready  
Work Revenue  
Loss

~\$1.2M / Yr



# Gap Analysis Findings

Great opportunity for cost recapture (permit process)

Large percentage of poles not permitted with no fees collected and lost opportunity for Make-Ready work

Unauthorized attachments marginalize safety and reliability

GIS database contains JUP data from Ten Year Survey

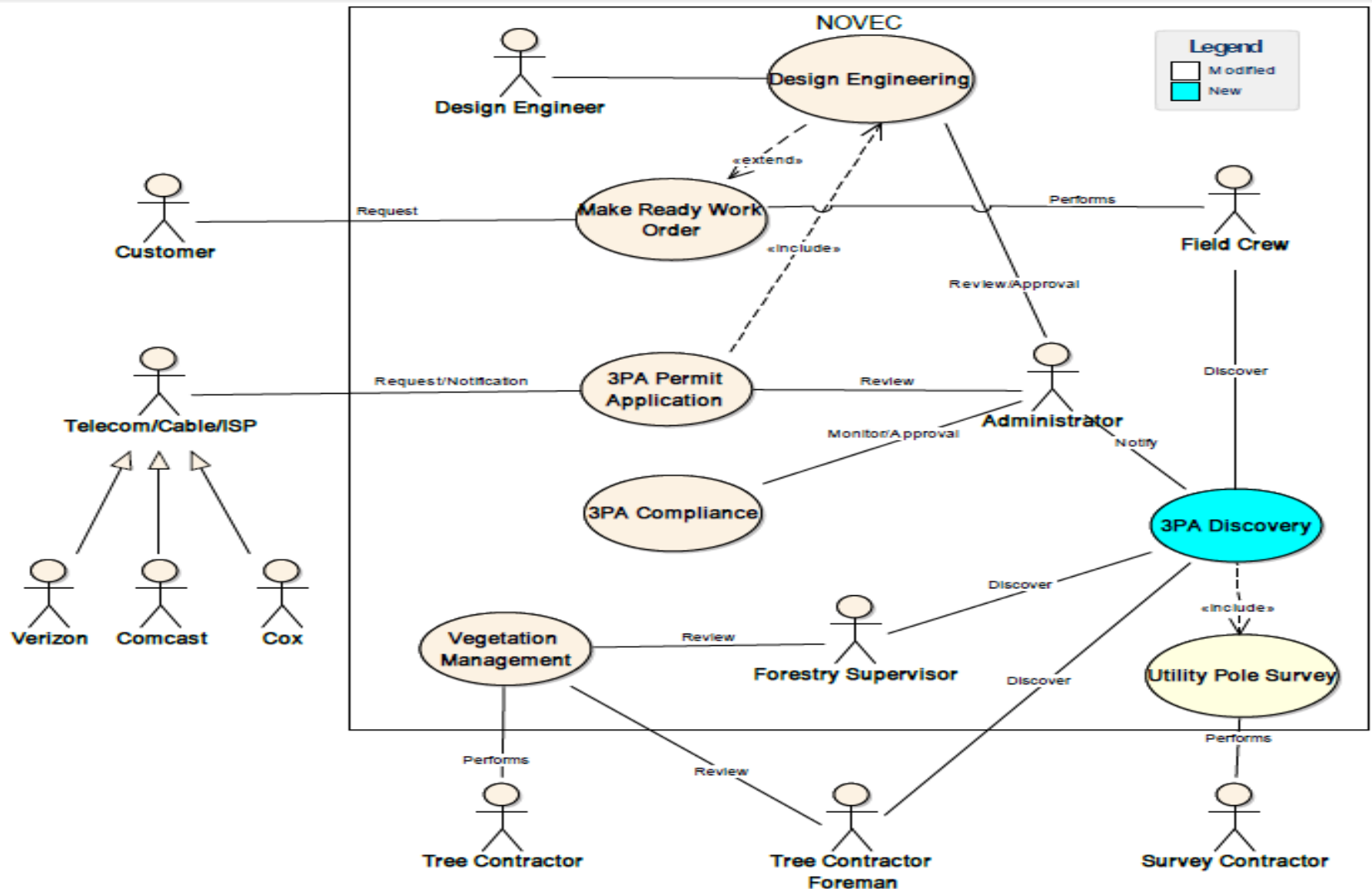
No process to maintain, discover or update JUP database

Tree crews see 80% of NOVEC Utility Pole system every 3.5 years

# High-Level Operational Concept



# Architecture



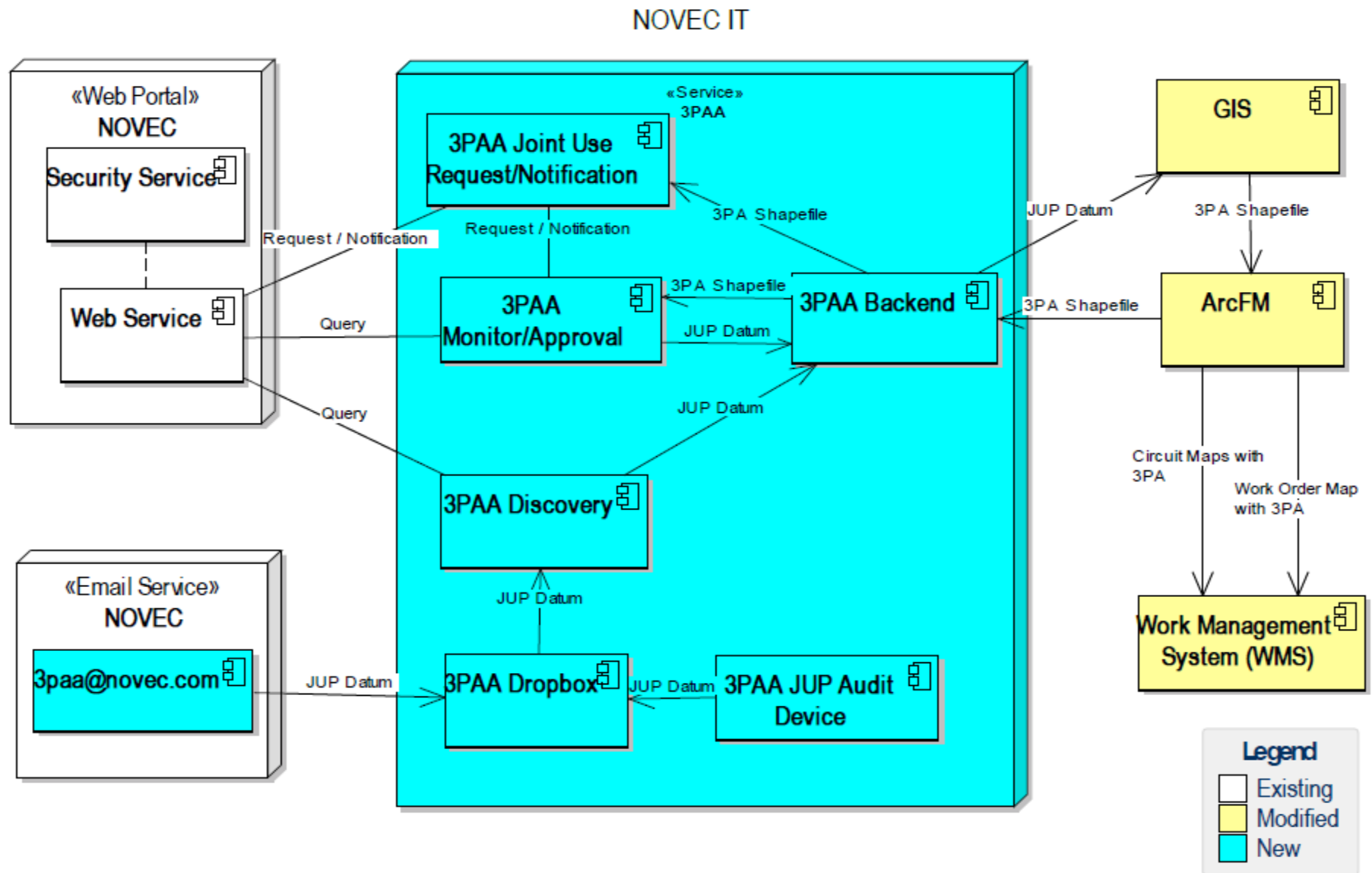


# Requirements

Description
The ArcFM shall generate overlays with JUP attributes
The ArcFM shall export ESRI shape files with JUP attributes
The ArcFM shall generate Circuit Maps with JUP attributes
The WMIS shall include JUP data on Work Orders
The 3PAA shall update GIS database with discovered JUP data
The 3PAA shall update GIS database with approved permit application JUP data
The 3PAA shall display ESRI shape files with JUP attributes
The 3PAA shall be capable of recording the number of attachments and ownership of attachments per utility pole.
The 3PAA shall export Geo-Reference Imagery to GIS database
The 3PAA shall import Geo-Reference Imagery with JUP data

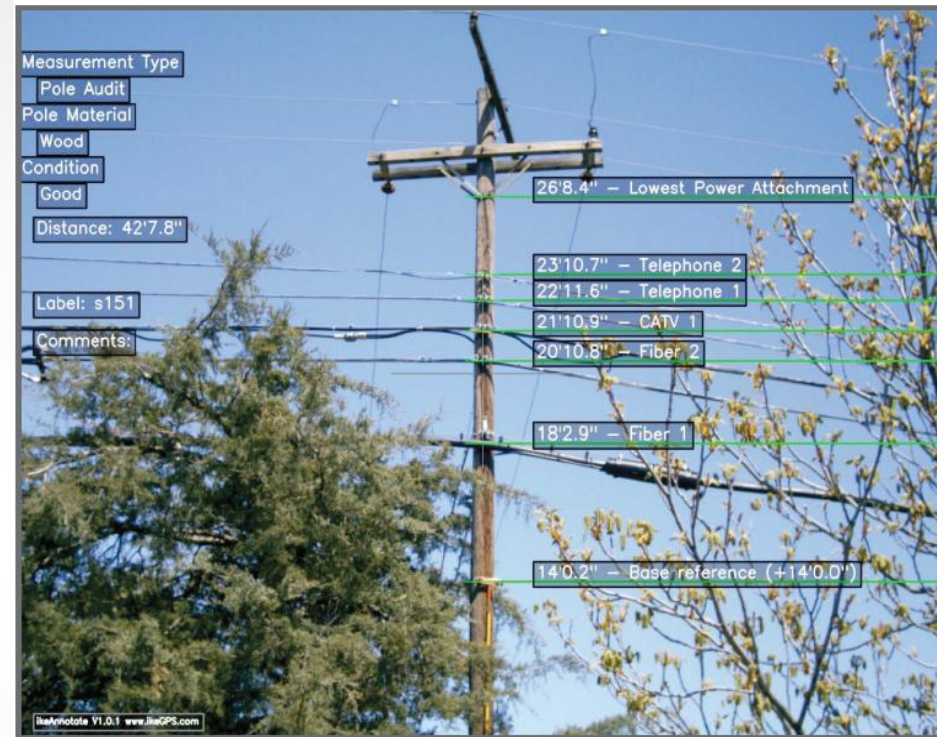
# Reference Design Model

## Systems Interface Description (SV-1)



# 3PAA Discovery/Compliance/Survey (ikeGPS™)

Combines GPS, laser range finder, 3D compass and digital camera technology.



Quickly capture location and a calibrated image of any pole that allows for accurate measurement of attachments, heights and distances.



# Prototype Solutions- 3PAA Permit Application

Secure Web Portal for  
3<sup>rd</sup> Party Users

User can navigate or  
search for specific  
locations

Only new information  
related to attachment  
request

NOVEC - Joint Use Notification and Request - Mozilla Firefox

File Edit View History Bookmarks Tools Help

☐ NOVEC - Joint Use Notification and Req... +

**NOVEC**  
Investing in Our Communities

Map showing location markers and a table of details:

LOCATIONID	331043011
JOINT_USE	NOVEC
ADC_GRID	PW02F12
COUNTY	Prince William
ADDRESS	SHELTER LN 13600
OWNER	NOVEC
POLEHEIGHT	40
MATERIAL	Wood

Legend: NOVEC, Verizon, Verizon, Comcast, Verizon, Cox, Comcast, Cox

**Joint Use Notification and Request**

Search

COMPANY: Comcast ORIGINATOR: Jimi.Hendrix@comcast.com  
OWNER: NOVEC LOCATION (NO RFD): SHELTER LN 13600

TYPE OF ATTACHMENT: STRAND: 1/4" CABLE: 0.625

POLE INVENTORY: FIELD POLE #: 331043011 MAP POLE #: 5  
HEIGHT: 40' CLASS OF POLE: 4

INVENTORY DATE: INVENTORY BY:

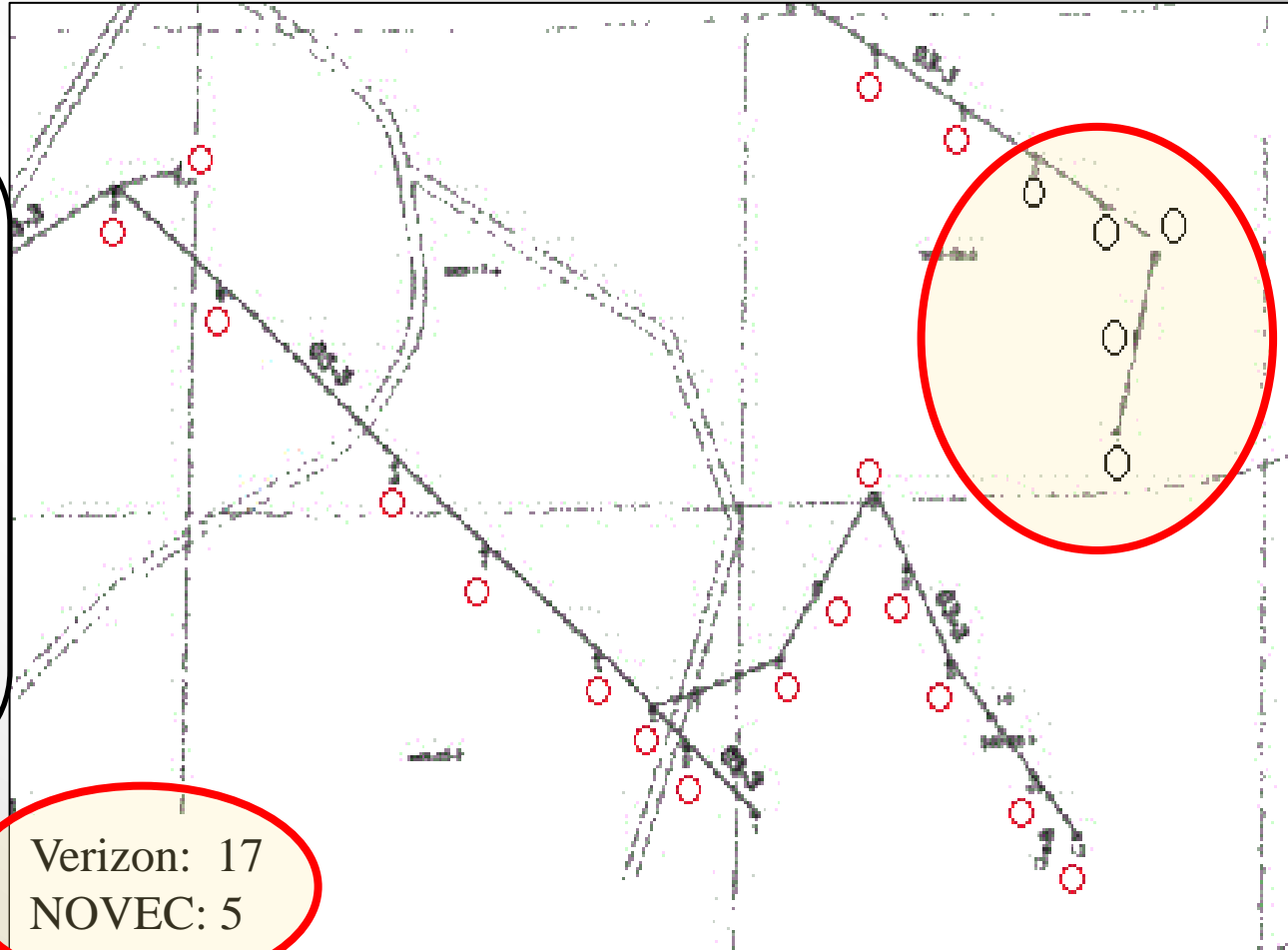
TOP OF POWER RISER: ☐ LOWEST NOVEC ATTACHMENT: NEUTRAL / LOWEST SECONDARY:

STREET LIGHT: ☐ STREET LIGHT WIRE: ☐



# Prototype Solutions- 3PAA Discovery (Part I)

Revised Process  
for Field Crews,  
Forestry  
Supervisor &  
Tree Trimming  
Foreman:



# Prototype Solutions- 3PAA Discovery (Part II)

Video





# Prototype Solutions- 3PAA Compliance

Compliance /  
Review of  
Permit

Receive  
notification of  
discovered JUP

Initiate cost  
recovery process

NOVEC - Joint Use Compliance - Mozilla Firefox

File Edit View History Bookmarks Tools Help

NOVEC - Joint Use Compliance

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Tip: 41'1" W: 1'1"

Ground: 0'0" W: 1'4"

Legend: NOVEC Verizon Verizon, Comcast Verizon, Cox Comcast Cox

**Joint Use Compliance**

COMPANY: Comcast	ORIGINATOR: Jimi.Hendrix@comcast.com
OWNER: NOVEC	LOCATION (NO RFD): SHELTER LN 13600
POLE INVENTORY:	FIELD POLE #: 331043011
TYPE OF ATTACHMENT:	HEIGHT: 40'
INVENTORY DATE: 2013-02-25	STRAND: 1/4"
TOP OF POWER RISER: Yes	INVENTORY BY: Jimi Hendrix
STREET LIGHT: Yes	LOWEST NOVEC ATTACHMENT: 30'
	STREET LIGHT WIRE: Yes

MAP POLE #: 5  
CLASS OF POLE: 4  
CABLE: 0.625  
NEUTRAL / LOWEST SECONDARY: Yes

GO

Legend:

- H: 38'2" Primary Tap
- H: 33'2" X-arm
- H: 35'4" Cutout Bracket
- H: 31'7" W: 1'2" Neutral
- H: 31'1" Electric Riser
- H: 30'6" Guy
- H: 29'11" Transformer
- H: 27'7" CATV
- H: 25'6" W: 1'2" Verizon
- H: 25'7" Verizon

# Rough Order of Magnitude (ROM) Estimate (Part I)

Modify ArcFM and WMIS  
(~15K) to incorporate JUP  
indicators on Work Orders and  
Tree Trimming Circuit Maps

Evaluate 3PAA Architecture  
costs (~202K) against improved  
permitting and capture of 3<sup>rd</sup>  
Party Attachments.

## Software Labor Rates

Cost per Person-Month (Dollars)

## Results

### Software Development (Elaboration and Construction)

Effort = 10.9 Person-months

Schedule = 6.6 Months

Cost = \$142087

Total Equivalent Size = 5000 SLOC

The ROM is an estimation of the level of effort and cost to complete a proposed architecture (+/- 50% based on expert knowledge and experience of the team)



# Rough Order of Magnitude (ROM) Estimate (Part II)

3 Job Site  
Inspector  
45 Poles per  
Day  
21 Month  
Survey



Estimated Survey Cost with ikeGPS™ \$279,500

# Conclusions:

- Significant opportunity exists to recapture fees for non-permitted joint use (Make-Ready Work, Rental)
- Joint use permit process can realize improvements in customer response time by going digital
- Capabilities for reducing joint use auditing efforts exist and require upfront investment in training & infrastructure
- Enabling the GIS system as focal point for capturing joint use to support finance, permit processes, and auditing functions provides opportunities for efficiency and savings across NOVEC departments

# Recommendations

- Utilize System Requirements Document and 3PAA Reference Design to solicit and measure cost estimates for implementing digital process improvements
- Train and enable tree trimming inspectors to provide joint use auditing
- Provide full-time auditor to support processing permit violations
- Future GMU Efforts focused on Maintenance Cost Allocation, Survey Case Study and 3PAA Enhancements

# Questions?

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[john.eoghain.oneill@gmail.com](mailto:john.eoghain.oneill@gmail.com)

[douglas.smith.w@gmail.com](mailto:douglas.smith.w@gmail.com)



# Backup

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# Team

Matt Blanck - BSEE 2004 Michigan Tech University.

Currently works for Integrity Applications Incorporated as a lead Systems Engineer supporting government acquisition activities.

John O'Neill – BSCS 2000 Mary Washington College.

Currently works for Raytheon Intelligence and Information Systems as Principal Software Engineer supporting United States Navy and Air Force

Doug Smith – BSME 2008 University of Dayton. Currently works for Naval Surface Warfare Center, Dahlgren Division as a mechanical engineer supporting the United States Marine Corps

# NOVEC Make Ready Work Processes

**NOVEC**  
NORTHERN VIRGINIA ELECTRIC COOPERATIVE

**WORK REQUEST DETAIL**

WORK REQUEST: 139644

WR TYPE: DLINE  
PRIORITY/AC CODE: 2  
CLASSIFICATION: OTHER  
CATEGORY: CH  
CUST READY DATE: 10/07/2013

OPER DIST: GA  
LOCAL CODE: GA2  
TAX DIST: CL  
REQ COMP DATE: 11/22/2013

ENTRY DATE: 09/24/2013  
ENTERED BY: LEJ  
DESIGNER: JOHNSON, LODH E  
DESIGNER APPR: ( )

WR NAME: MARRURY LLC  
STREET NO:  
ST:

**STAKING SHEET**

WORK REQUEST: 139644  
REVISION NO: 1

WR TYPE: DLINE  
AC CODE:  
CLASSIFICATION: OTH  
CATEGORY:  
WIRE TYPE:  
REEL #:  
FOOTAGE:  
POINT/SPAN SU

OPER DIST: GA  
LOCAL DIST: GA2  
RUS CODE: 0100  
TAX DIST: CL

WR NAME: MARRURY LLC  
STREET: GUM SPRING  
CITY: CHANTILLY  
STATE: VA ZIP: 20152

**DESIGN**

WORK REQUEST: 139644  
REVISION: 1

P/S NO: 1  
COMMENTS: NONE

ACTION: CUA  
INSTALL: AG-2  
INSTALL: AR-1  
INSTALL: CT-5  
INSTALL: CT-6  
INSTALL: CT-7

INSTALLATIONS

INSTALL: DEF  
INSTALL: DEL  
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Printed: 10/04/2013

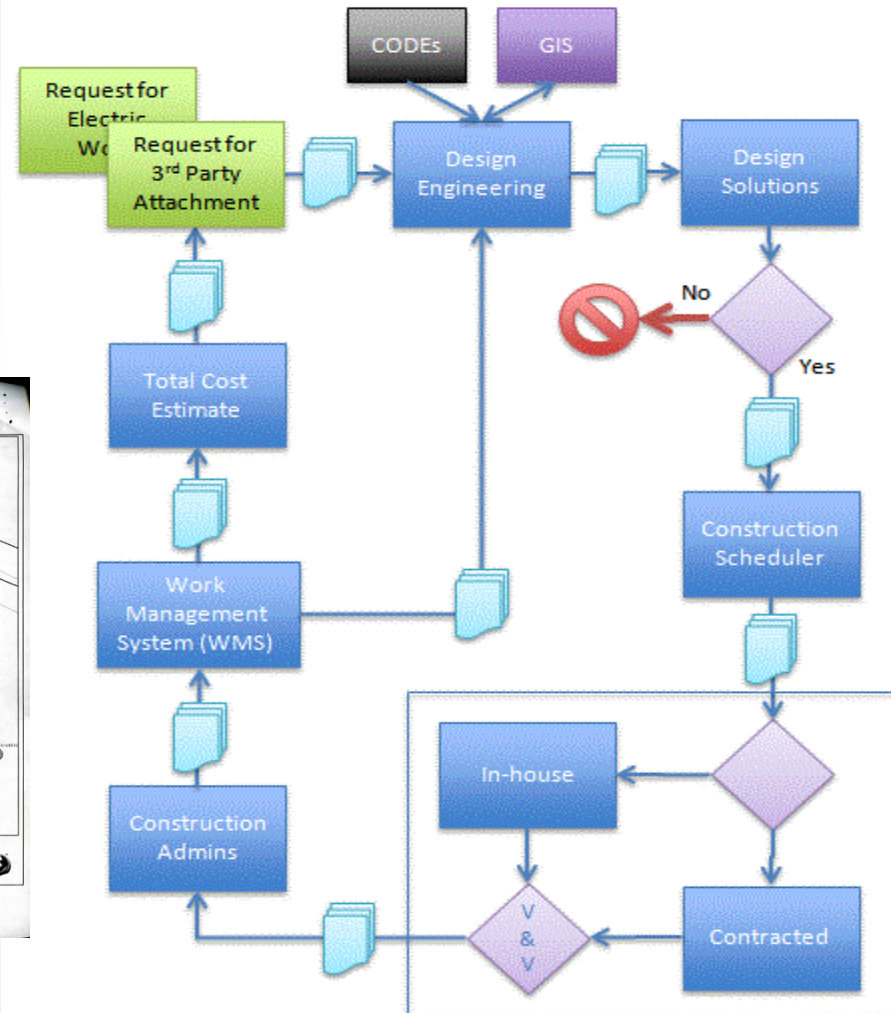
WORK REQUEST SKETCH

Design: JOHNSON, LODH E  
WR # 139644

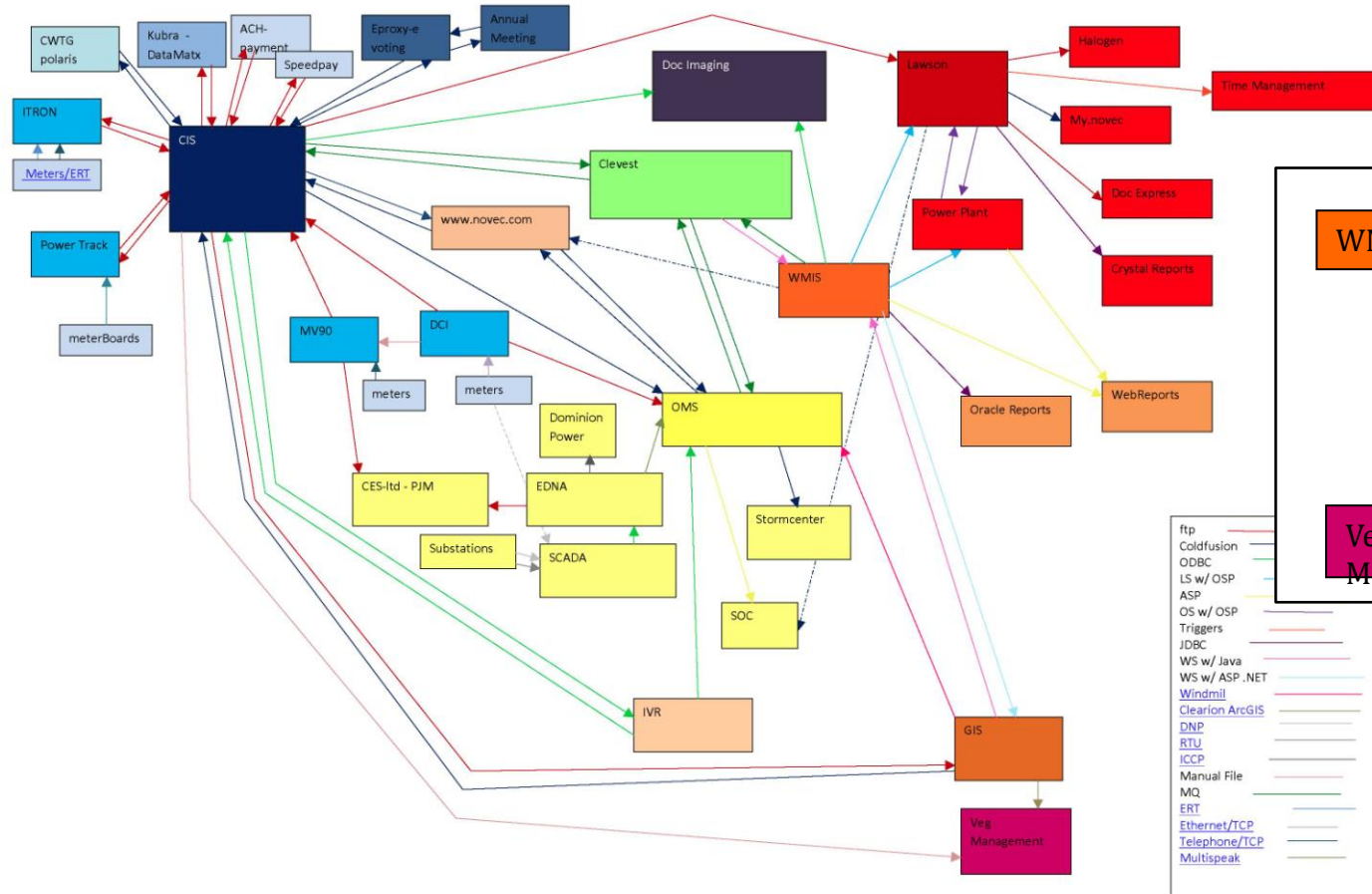
NOT TO SCALE

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NORTHERN VIRGINIA ELECTRIC COOPERATIVE

Do it Right

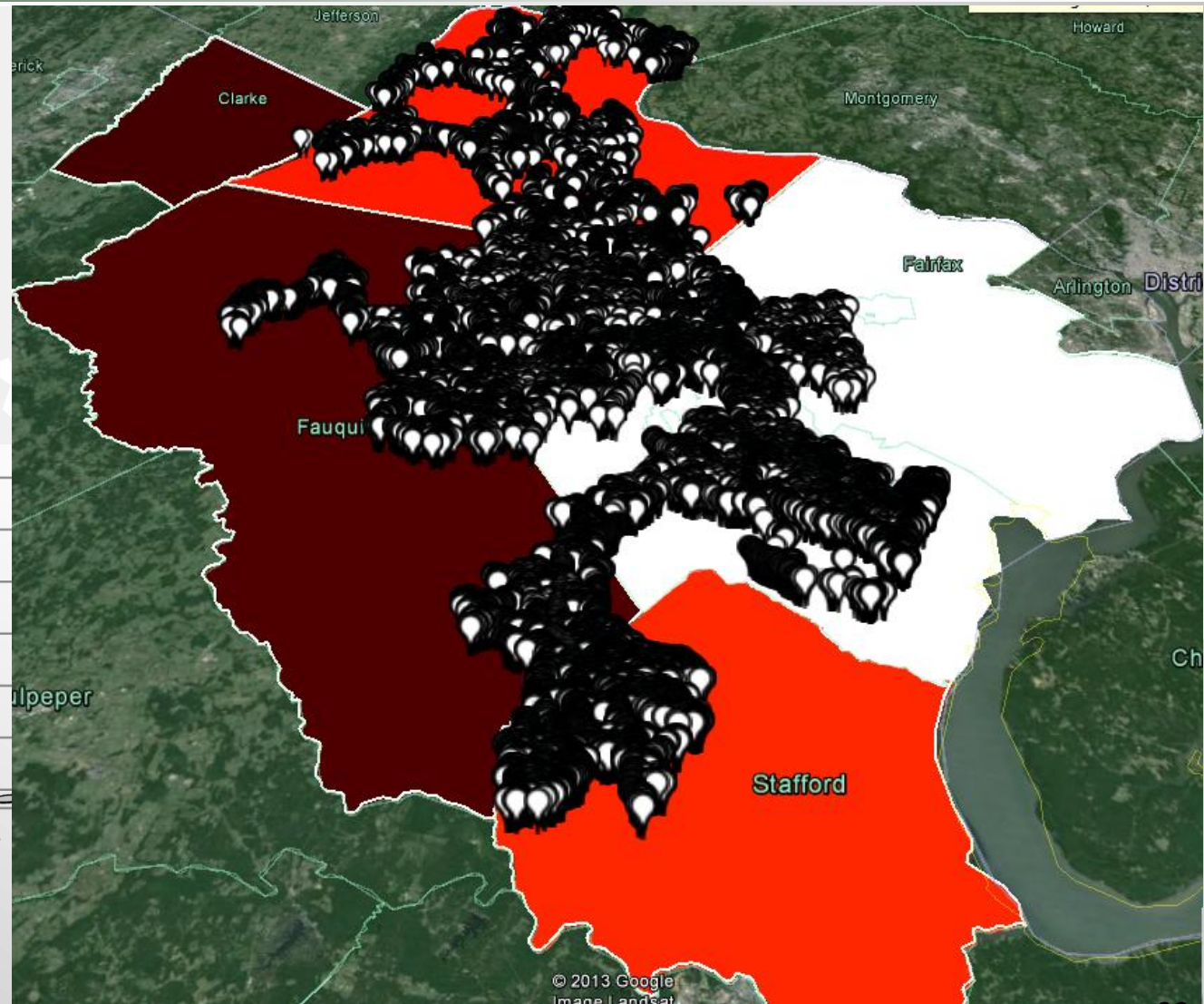
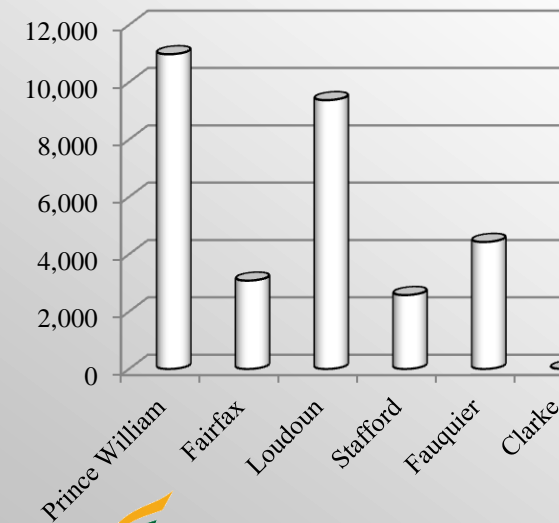
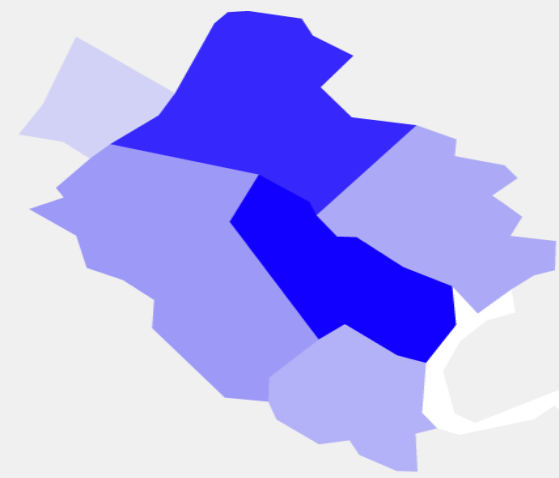


# NOVEC IT Architecture

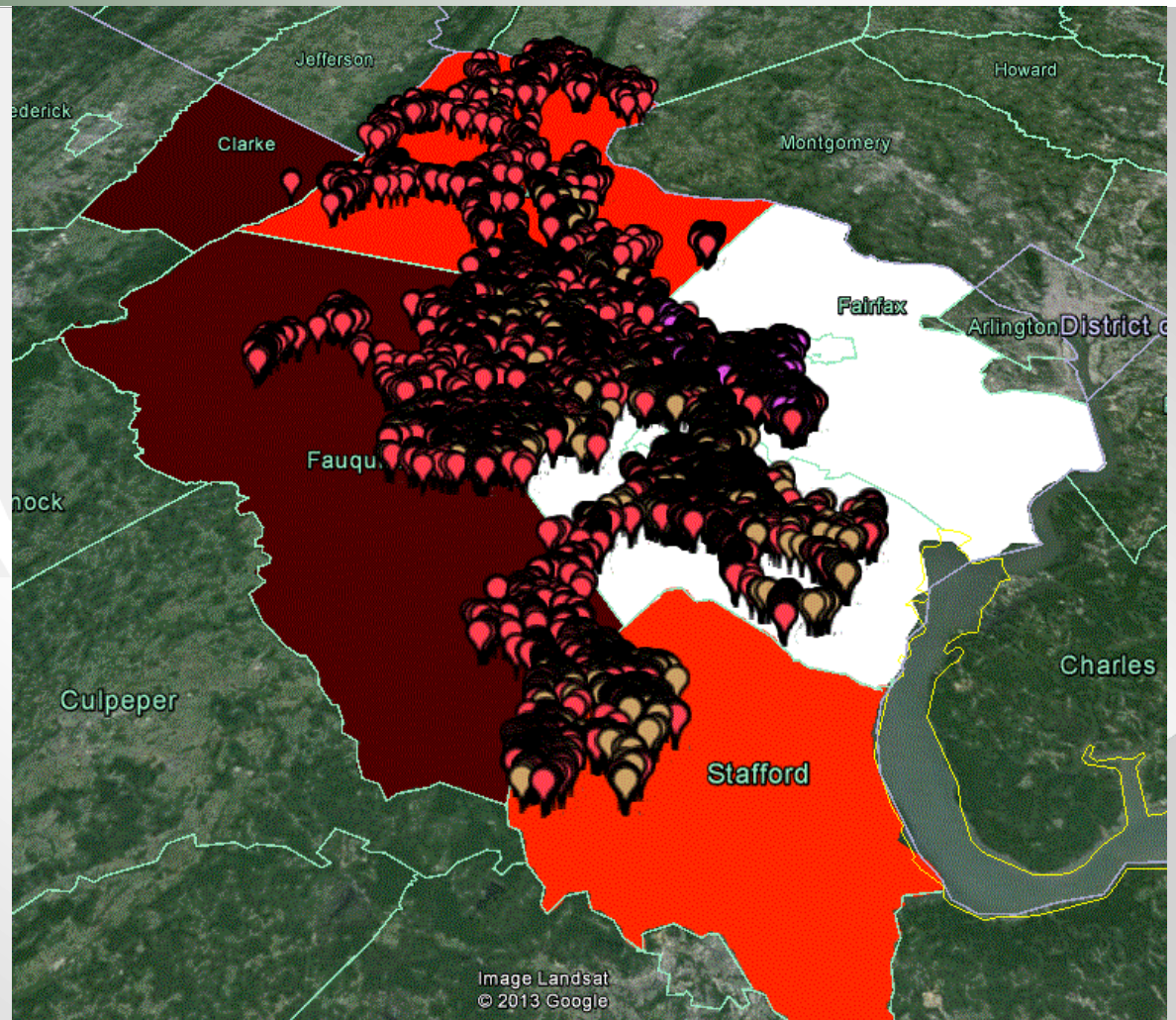
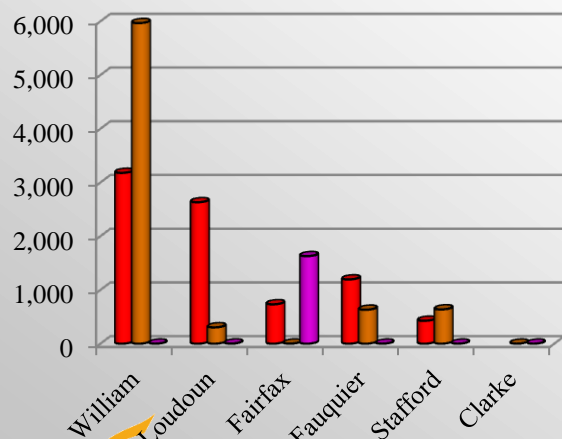
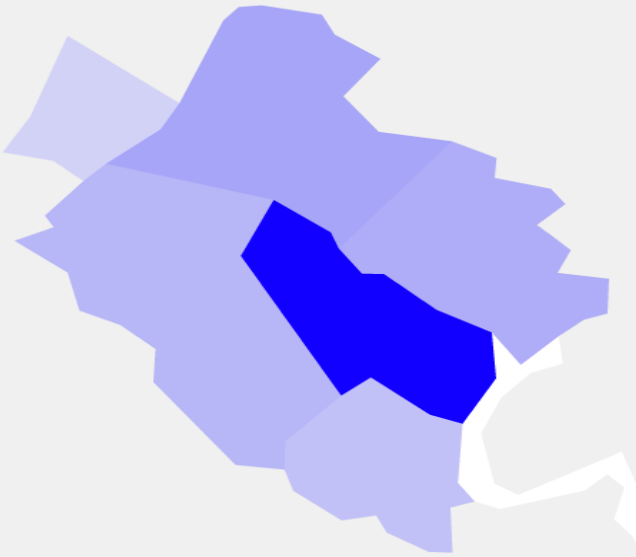




# Gap Analysis Findings- NOVEC



# Gap Analysis Findings- Verizon

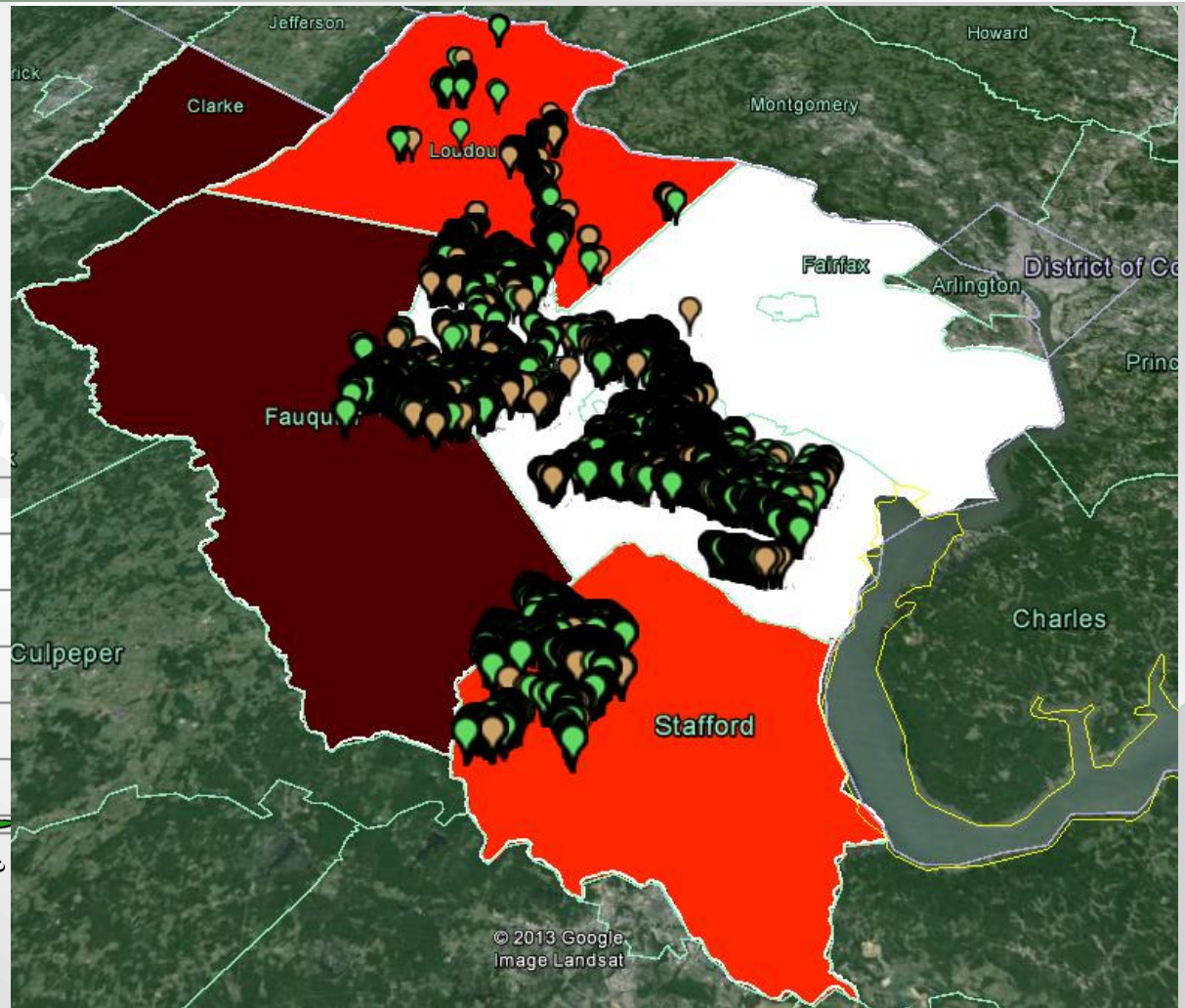
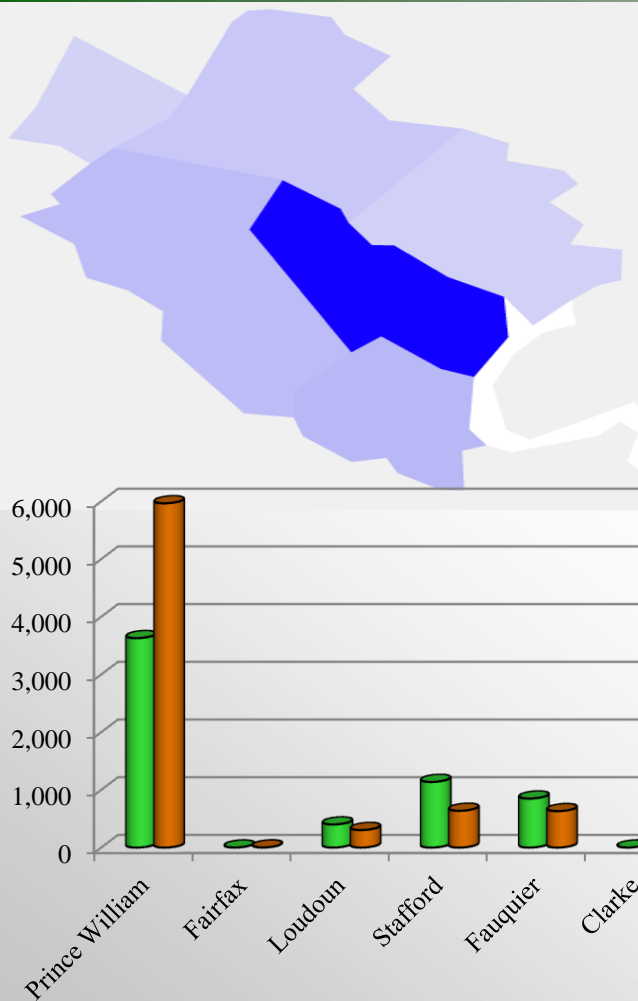


Verizon
 Verizon, Comcast
 Verizon, Cox

Where Innovation Is Tradition



# Gap Analysis Findings- Comcast



# Gap Analysis Findings- Cox

