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 3rd party vendors poses challenges sharing costs
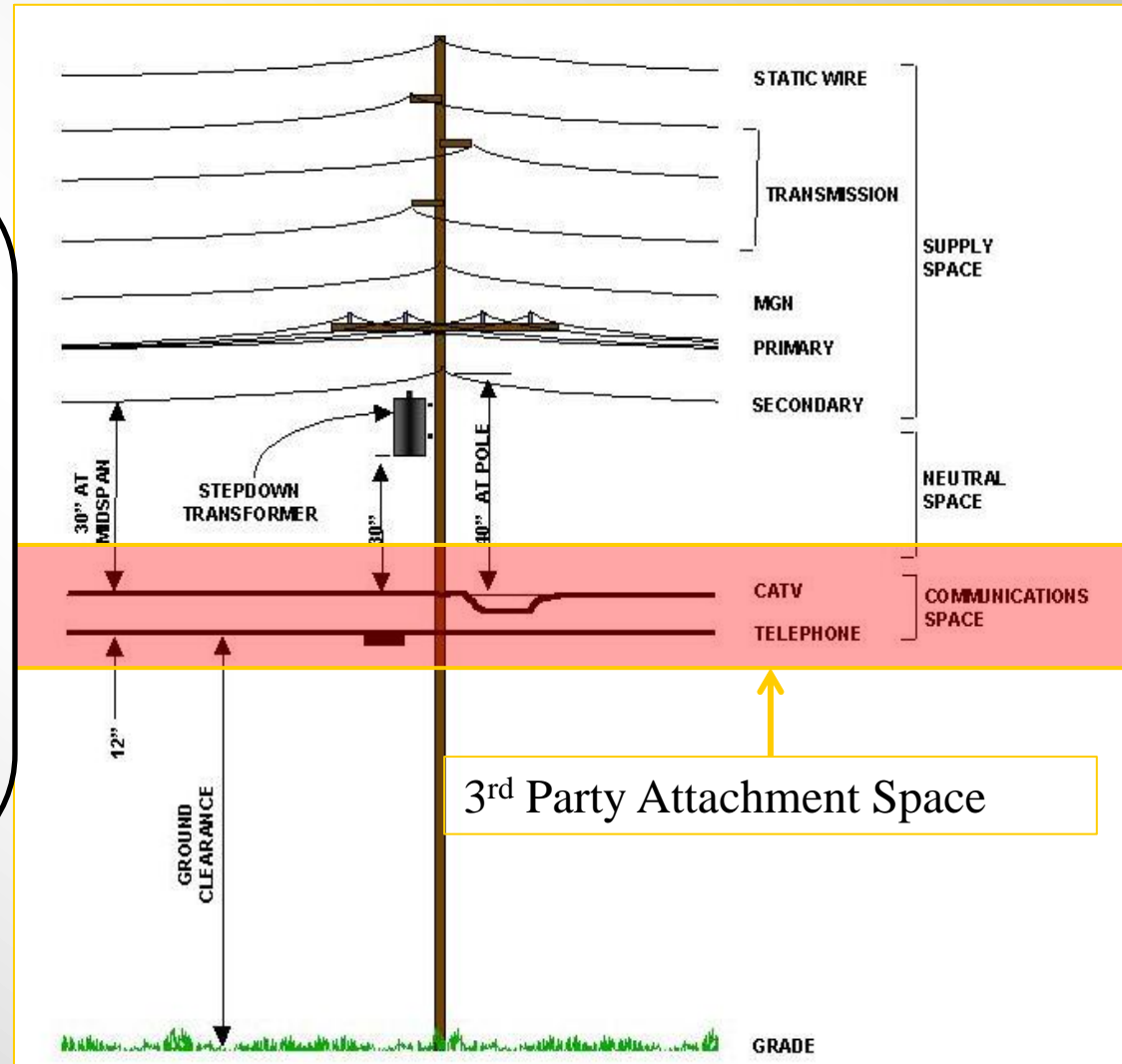
A system is desired by NOVEC to efficiently recapture shared costs

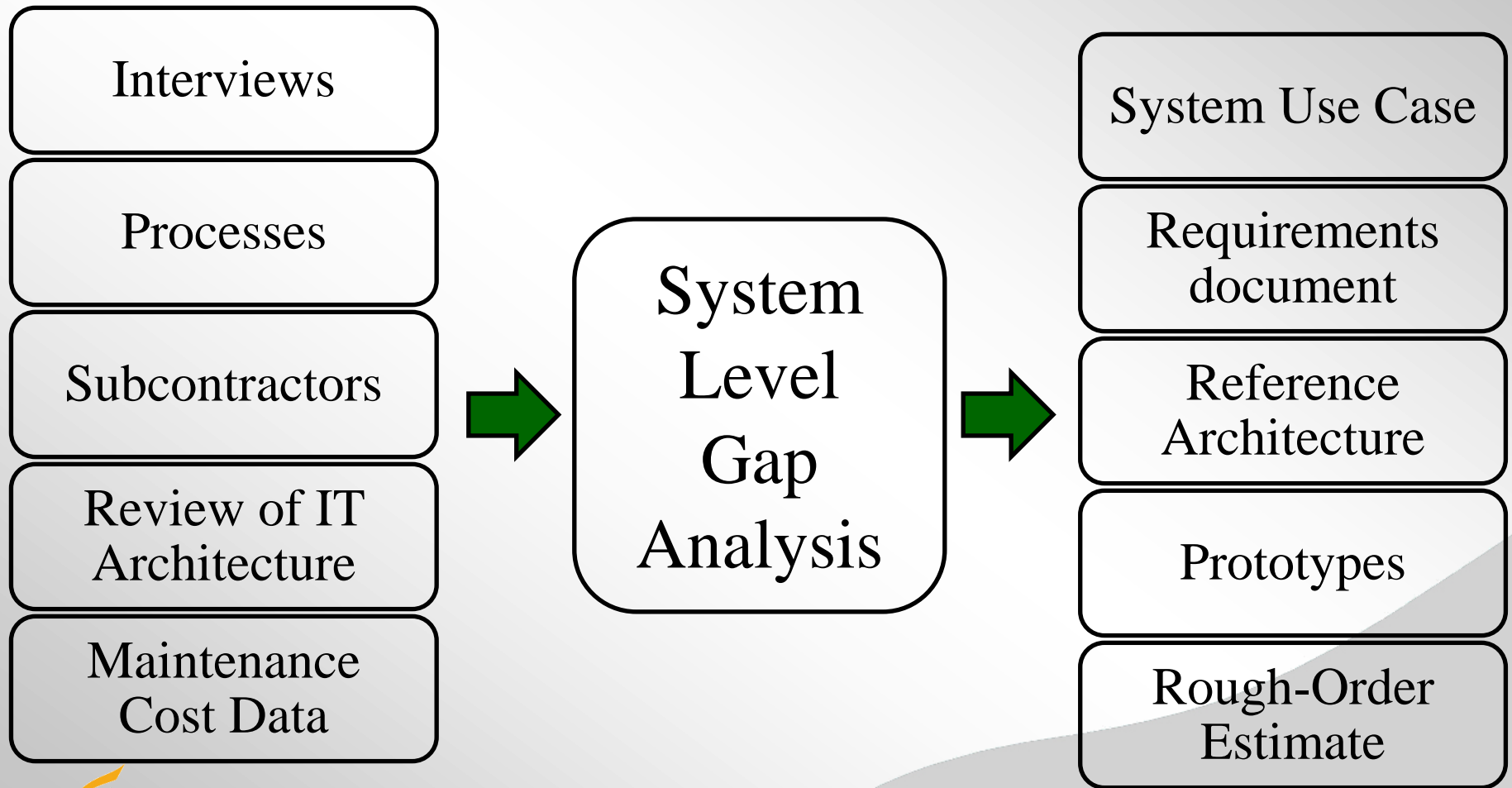The objective is to improve cost recapture through improved tracking of 3rd party attachments

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What is a 3rd Party Attachment?

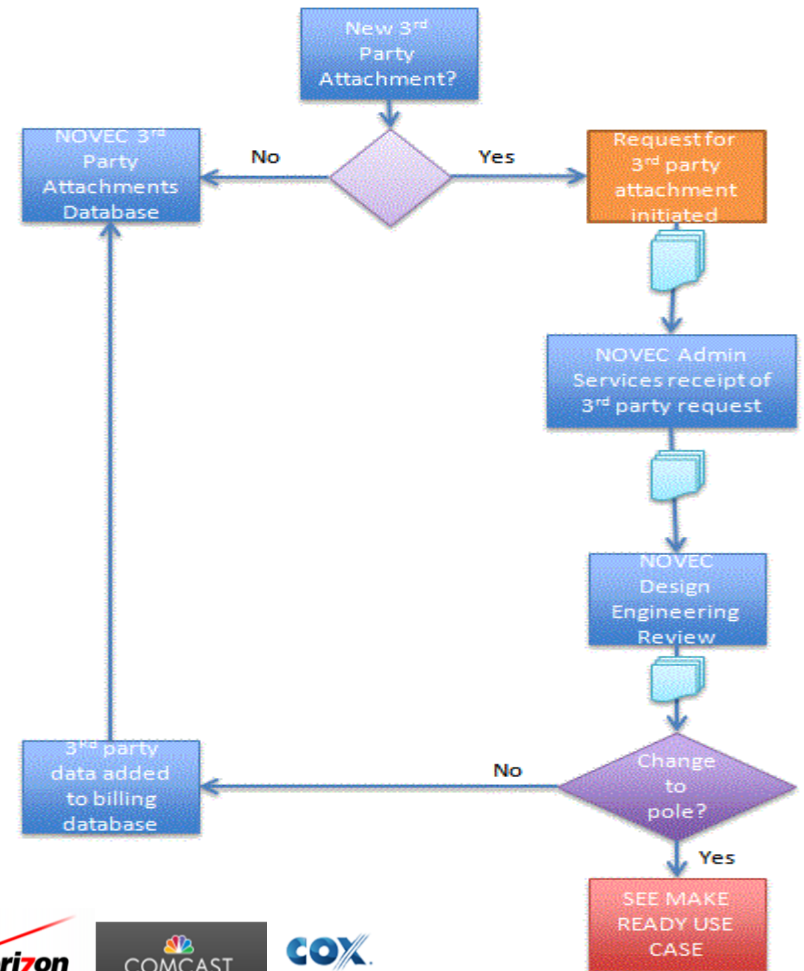Telecommunications or cable equipment that occupies space on a power utility's pole

3rd Party Attachment Space

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Approach

Interviews

Processes

Subcontractors

Review of IT Architecture

Maintenance Cost Data

→

System Level Gap Analysis

→

System Use Case

Requirements document

Reference Architecture

Prototypes

Rough-Order Estimate

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NOVEC Permit Application Process

Process is paper based

Take up to 9 months with a 3 month average

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NOVEC Tree-Trimming Process

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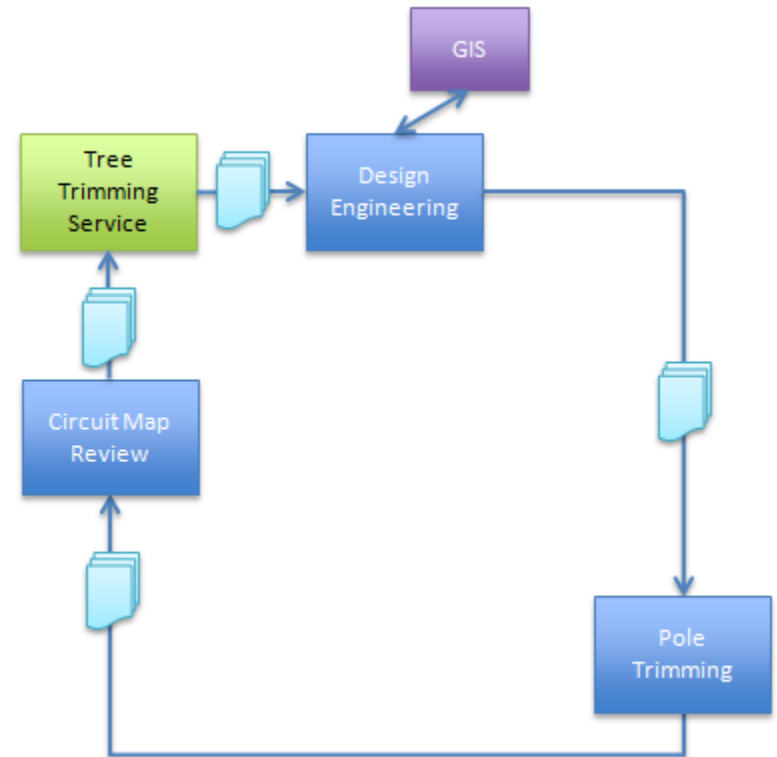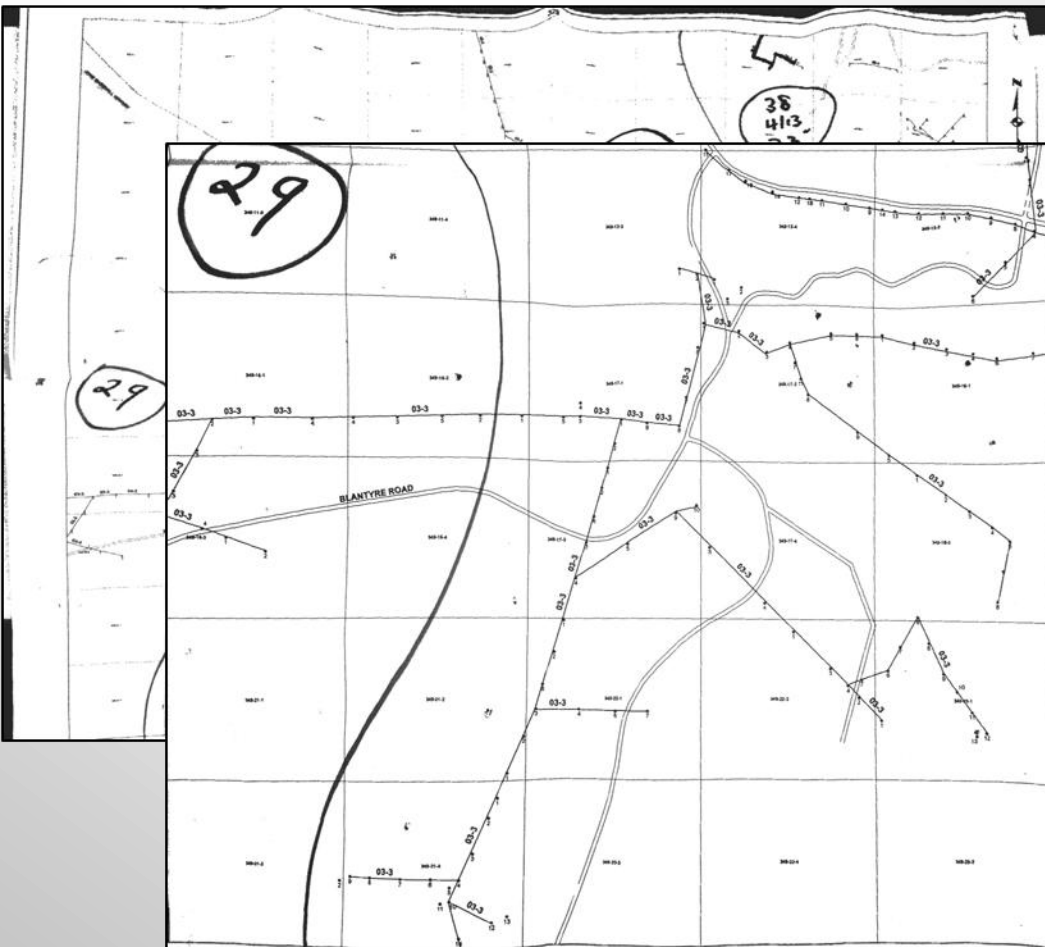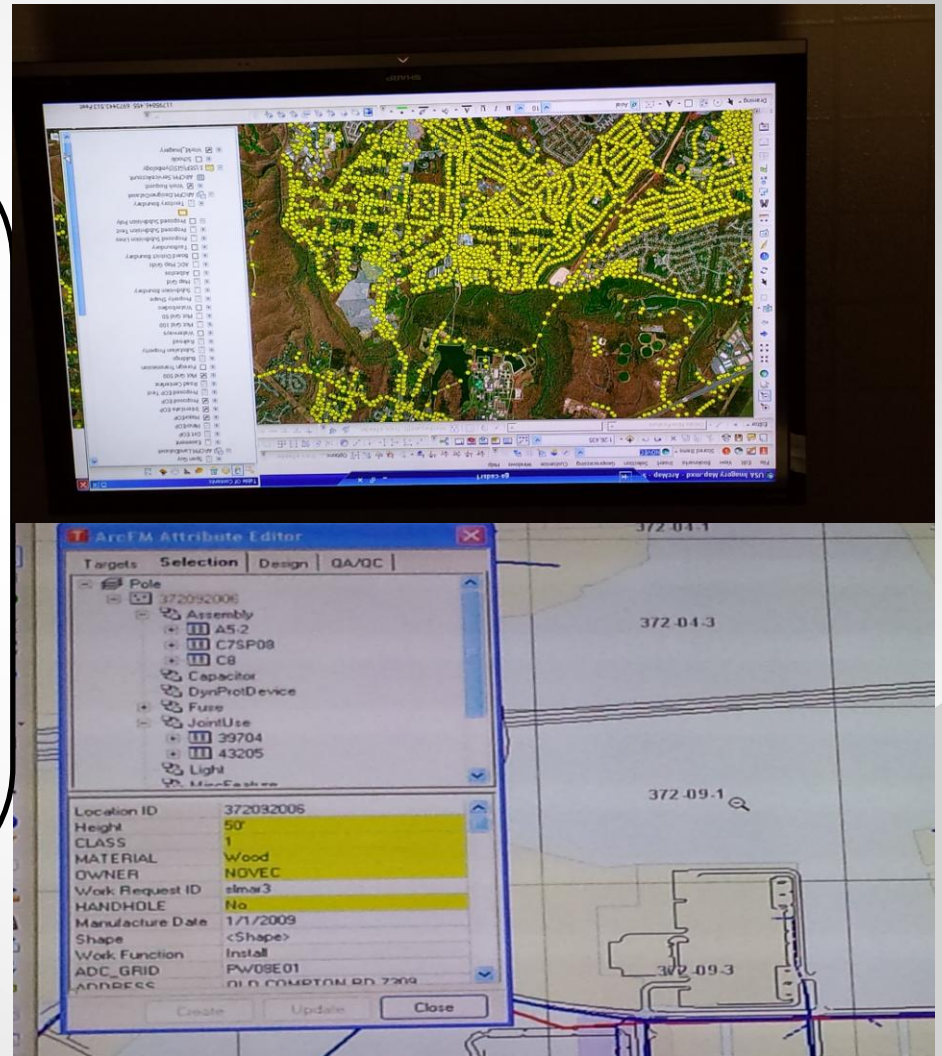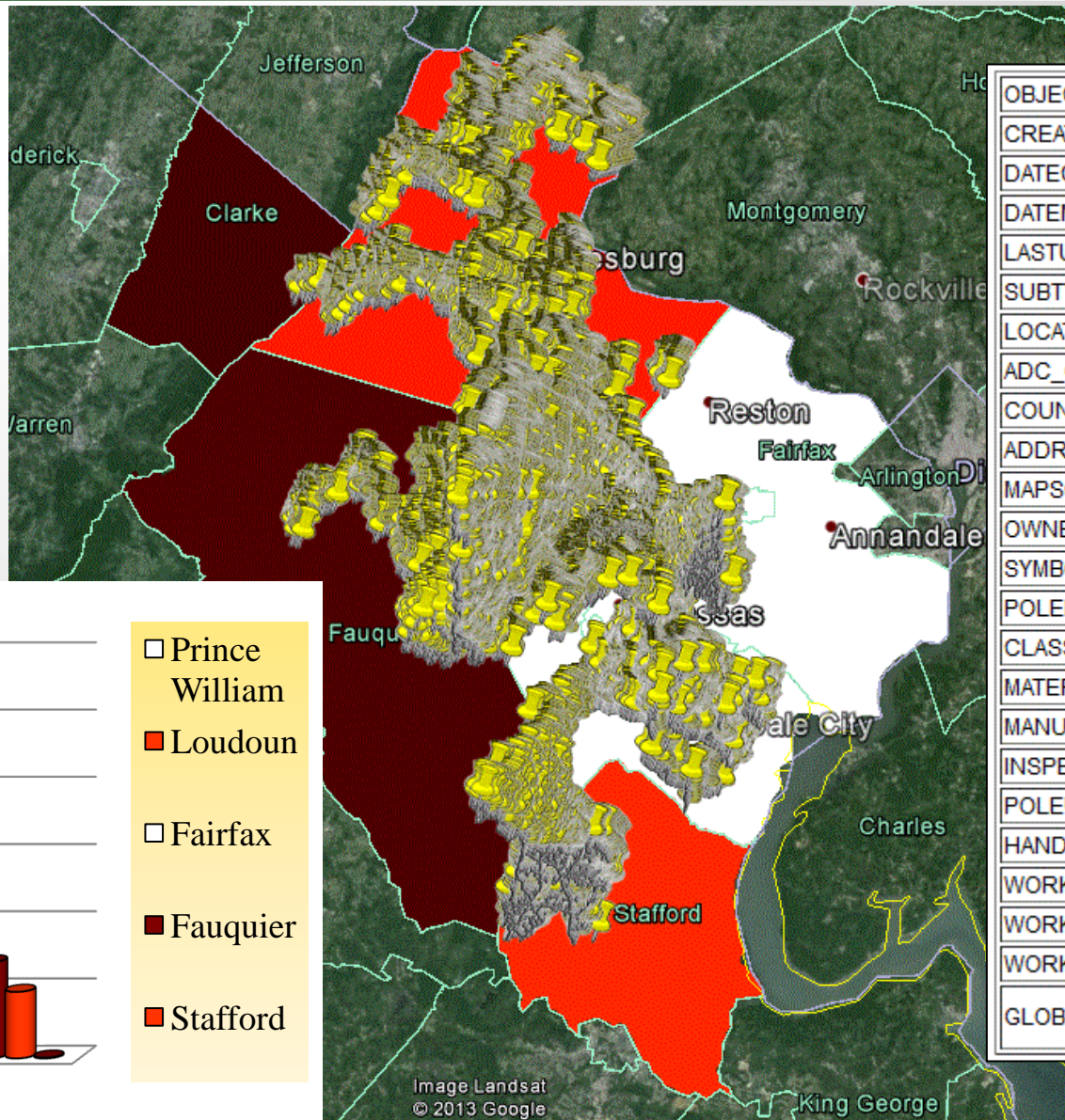
NOVEC ArcFM System

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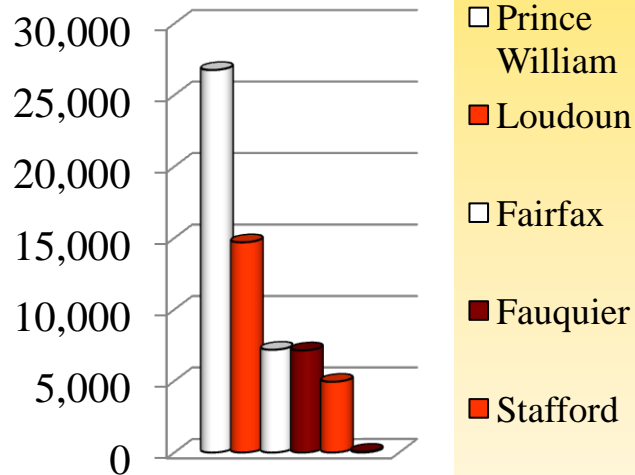
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NOVEC Utility Poles by County and Population

NOVEC Ten Year Survey

DAVEY

Survey 2010-2012:

22 Months

$427,000

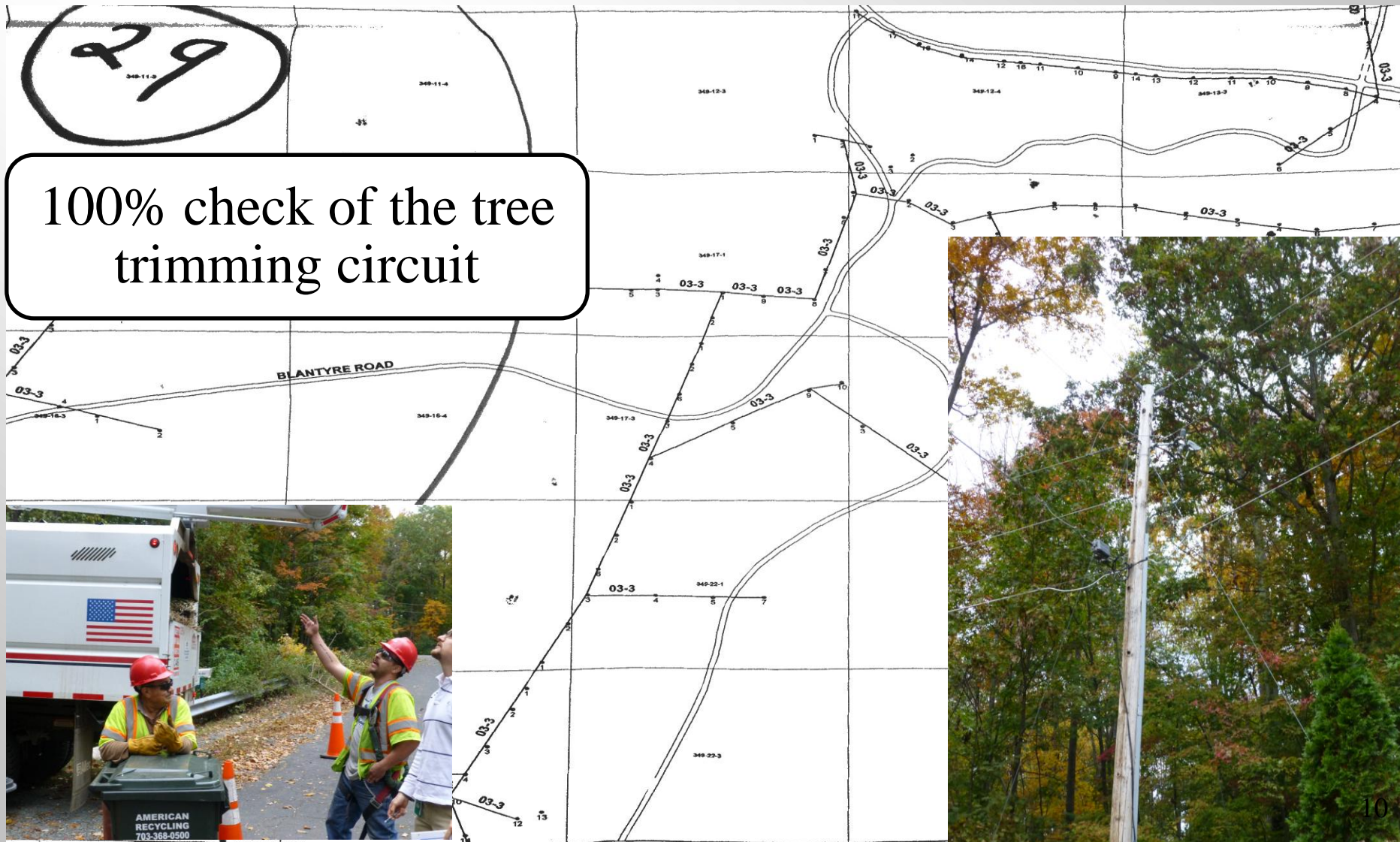## DRG SOLUTIONS

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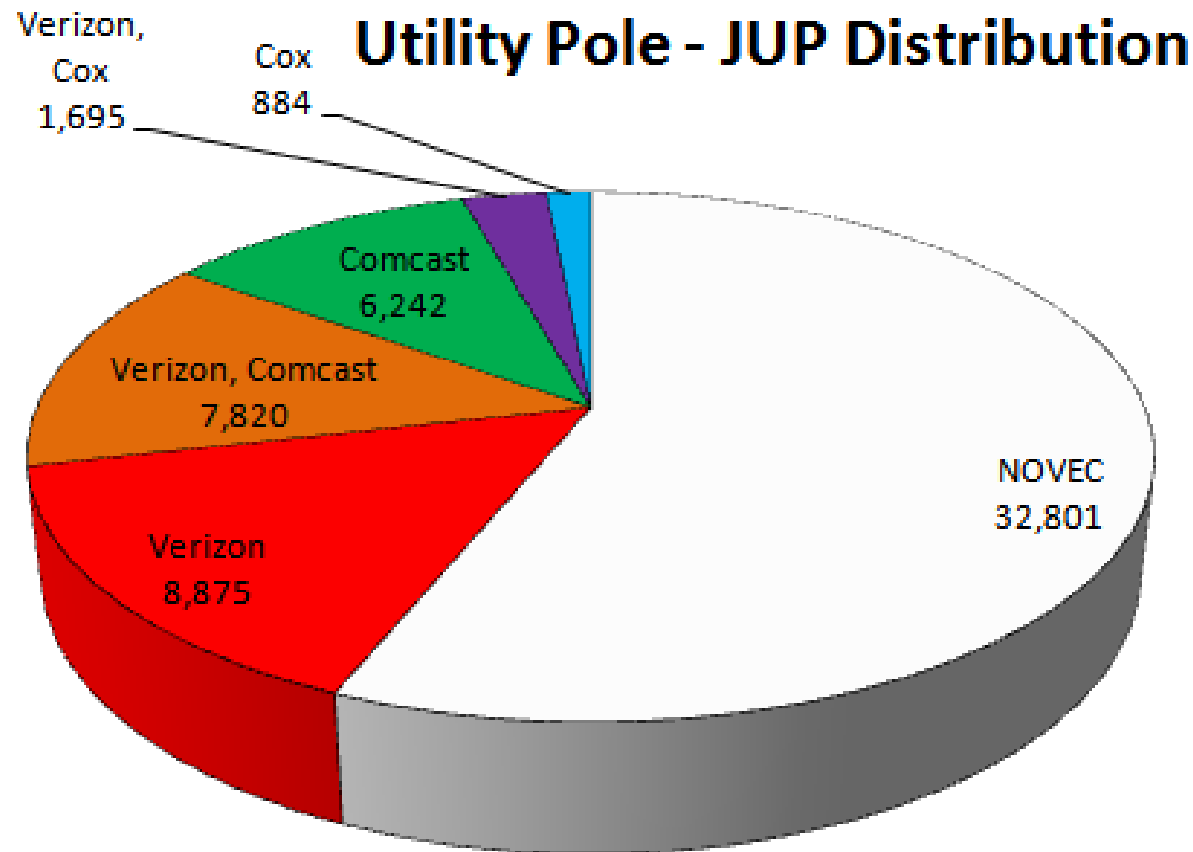
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Gap Analysis Findings

100% check of the tree trimming circuit

Gap Analysis Findings

Utility Pole - JUP Distribution

- Verizon, Cox 1,695
- Cox 884
- Comcast 6,242
- Verizon, Comcast 7,820
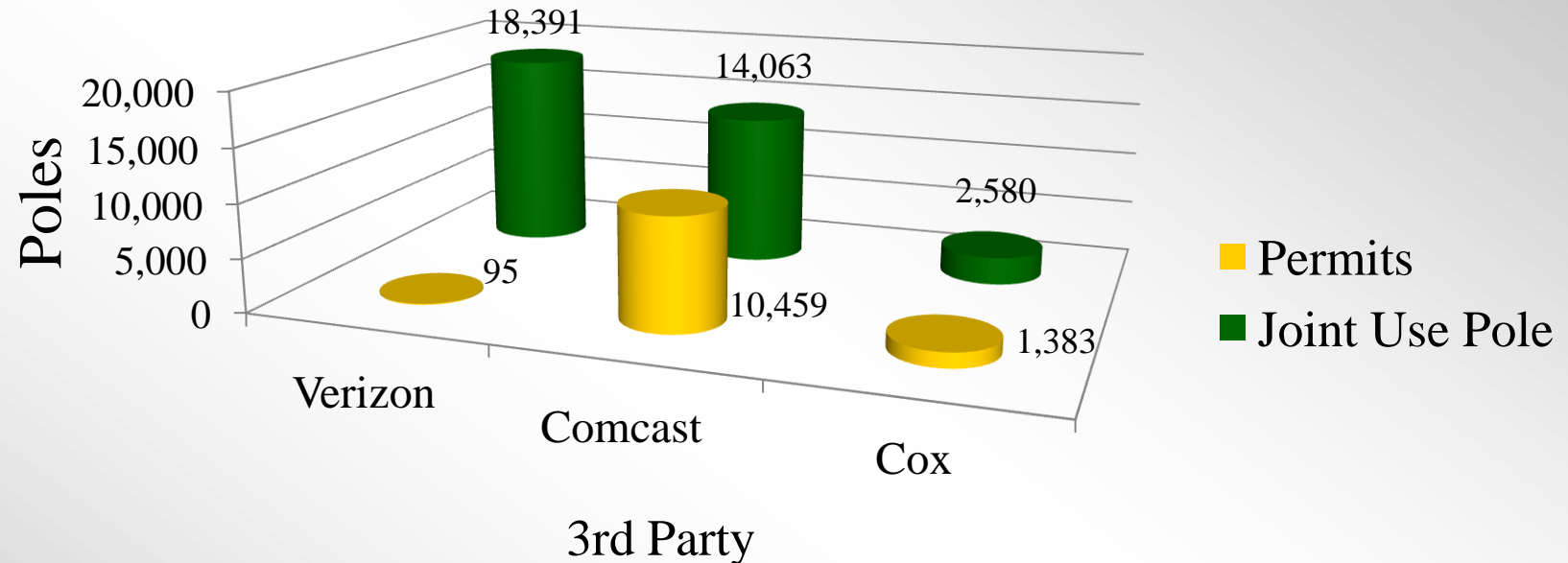- Verizon 8,875
- NOVEC 32,801

NOVEC Only 56%

Joint Use Poles (JUP) 44%

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

Gap Analysis Findings

Distibution of JUP and Permits

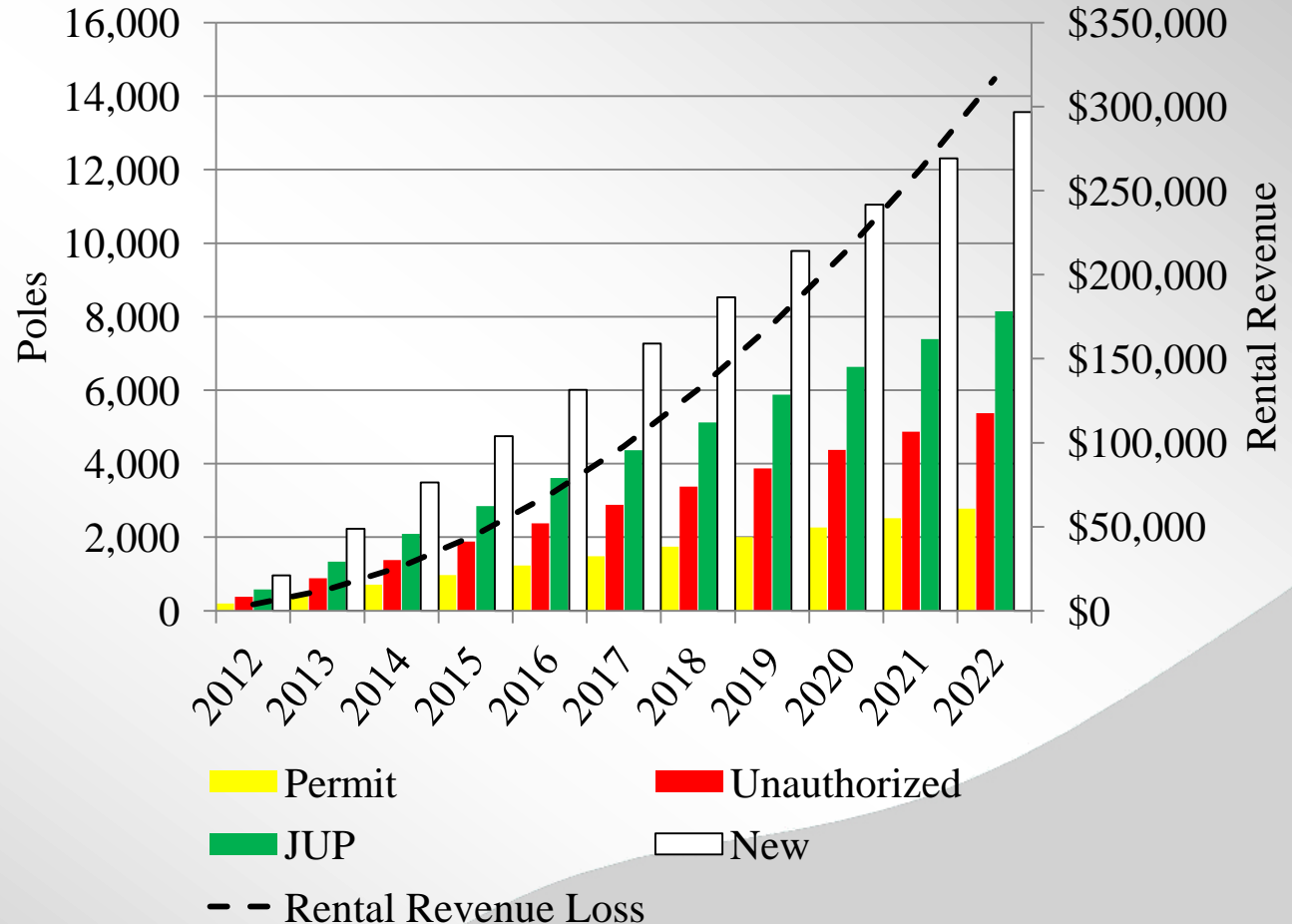2010-2012 NOVEC Pole Survey:

Data shows that only 34% have Permits

Gap Analysis Findings

~1260 New Poles / Yr

Make-Ready Work Revenue Loss

~$1.2M / Yr

Trend Analysis

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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

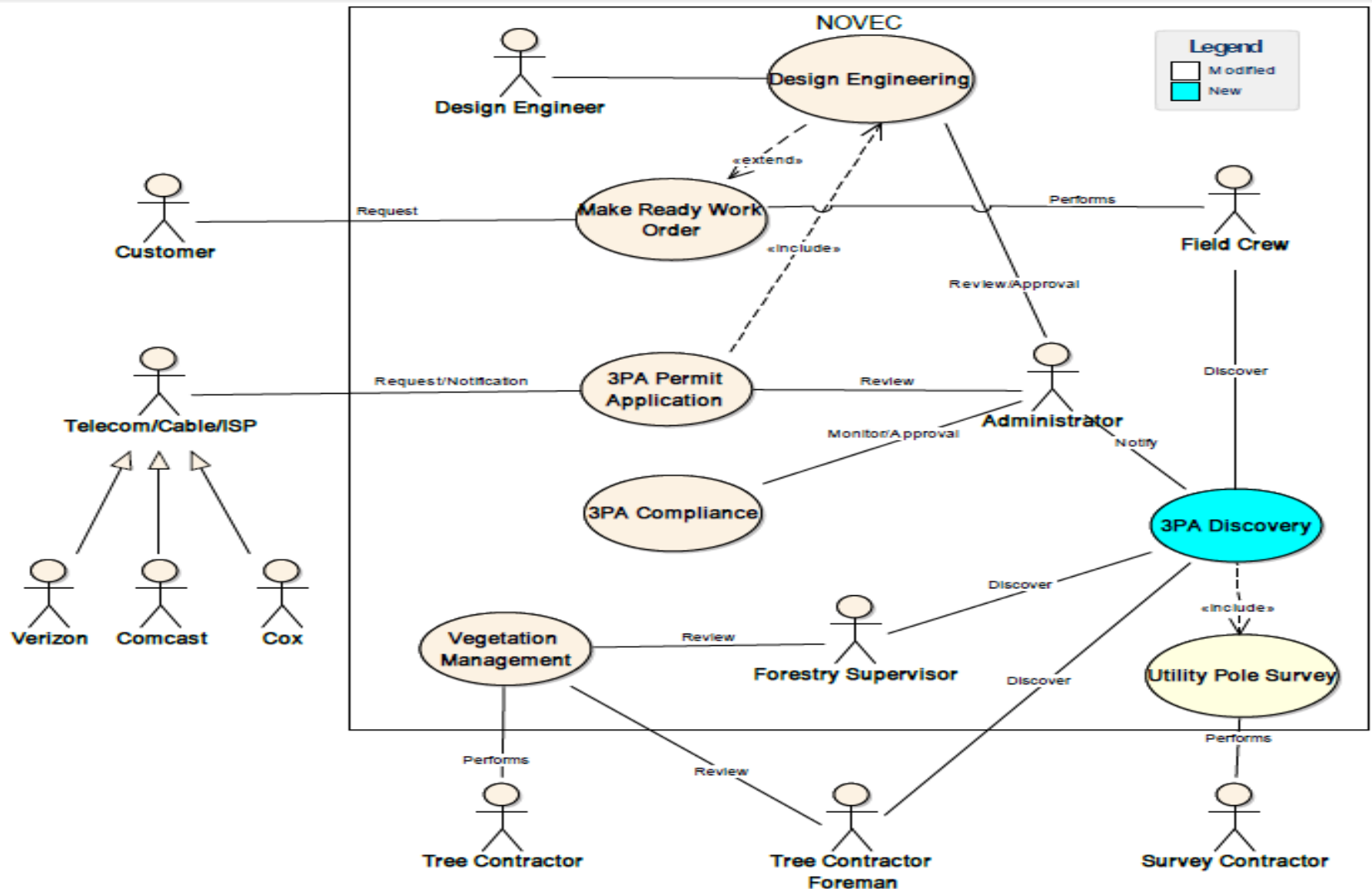GIS database contains JUP data from Ten Year Survey

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

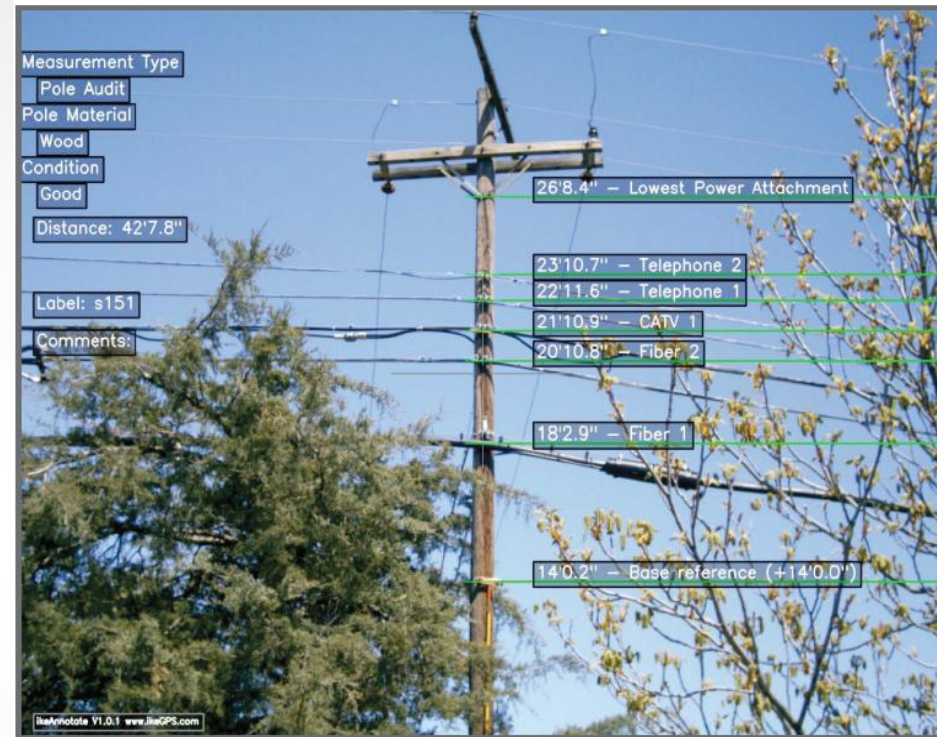GEORGE MASON UNIVERSITY

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Reference Design Model
Systems Interface Description (SV-1)
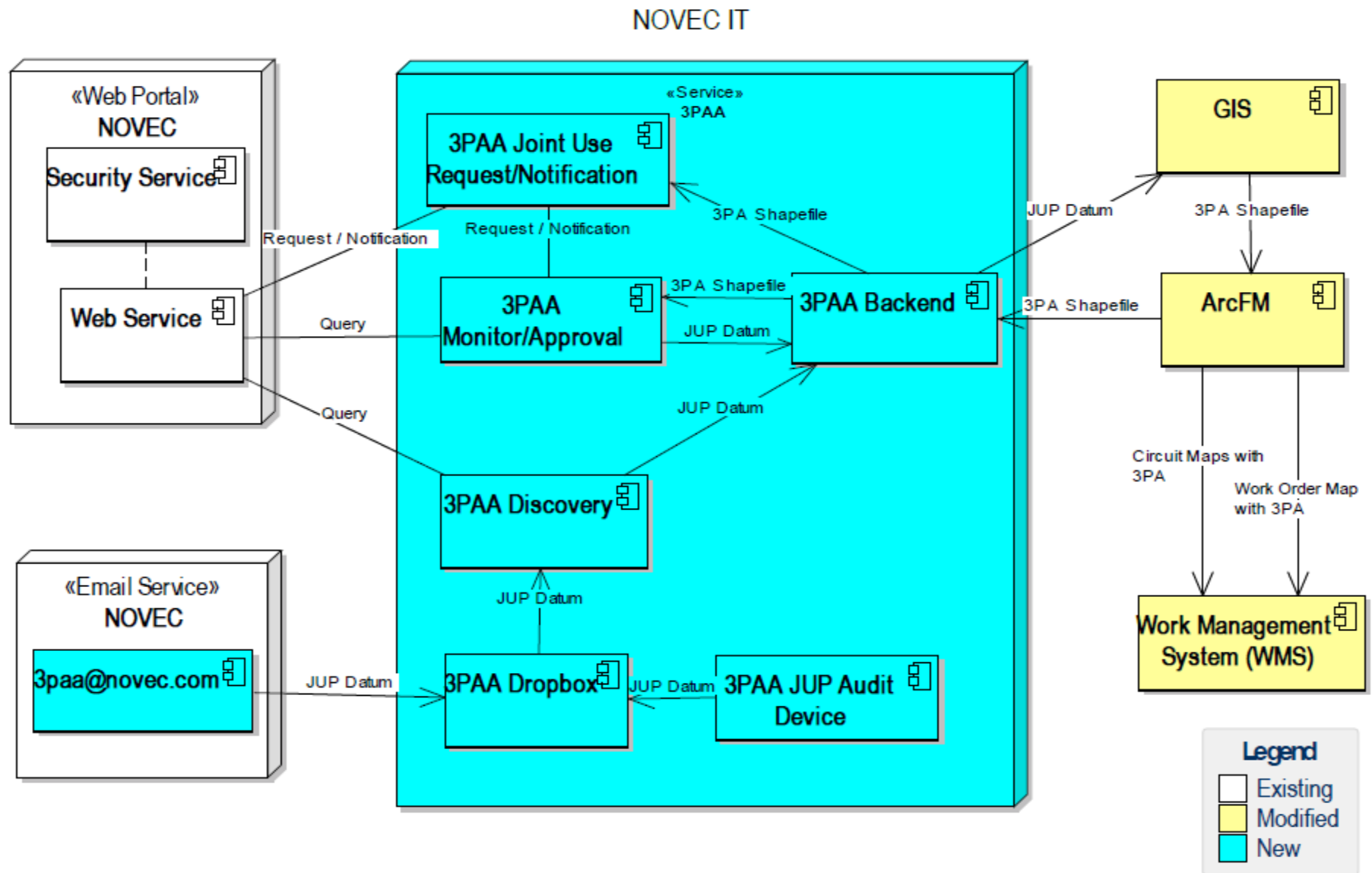
3PAA Discovery/Compliance/Survey (ikeGPS™)

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

Measurement Type
Pole Audit
Pole Material
Wood
Condition
Good
Distance: 42'7.8"

Label: s151
Comments:

26'8.4" — Lowest Power Attachment

23'10.7" — Telephone 2
22'11.6" — Telephone 1
21'10.9" — CATV 1
20'10.8" — Fiber 2

18'2.9" — Fiber 1

14'0.2" — Base reference (+14'0.0')

IkeAnnotate V1.0.1 www.ikeGPS.com

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

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Prototype Solutions-
3PAA Permit Application

Secure Web Portal for 3rd Party Users

User can navigate or search for specific locations

Only new information related to attachment request

Prototype Solutions-
3PAA Discovery (Part I)

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

Verizon: 17
NOVEC: 5
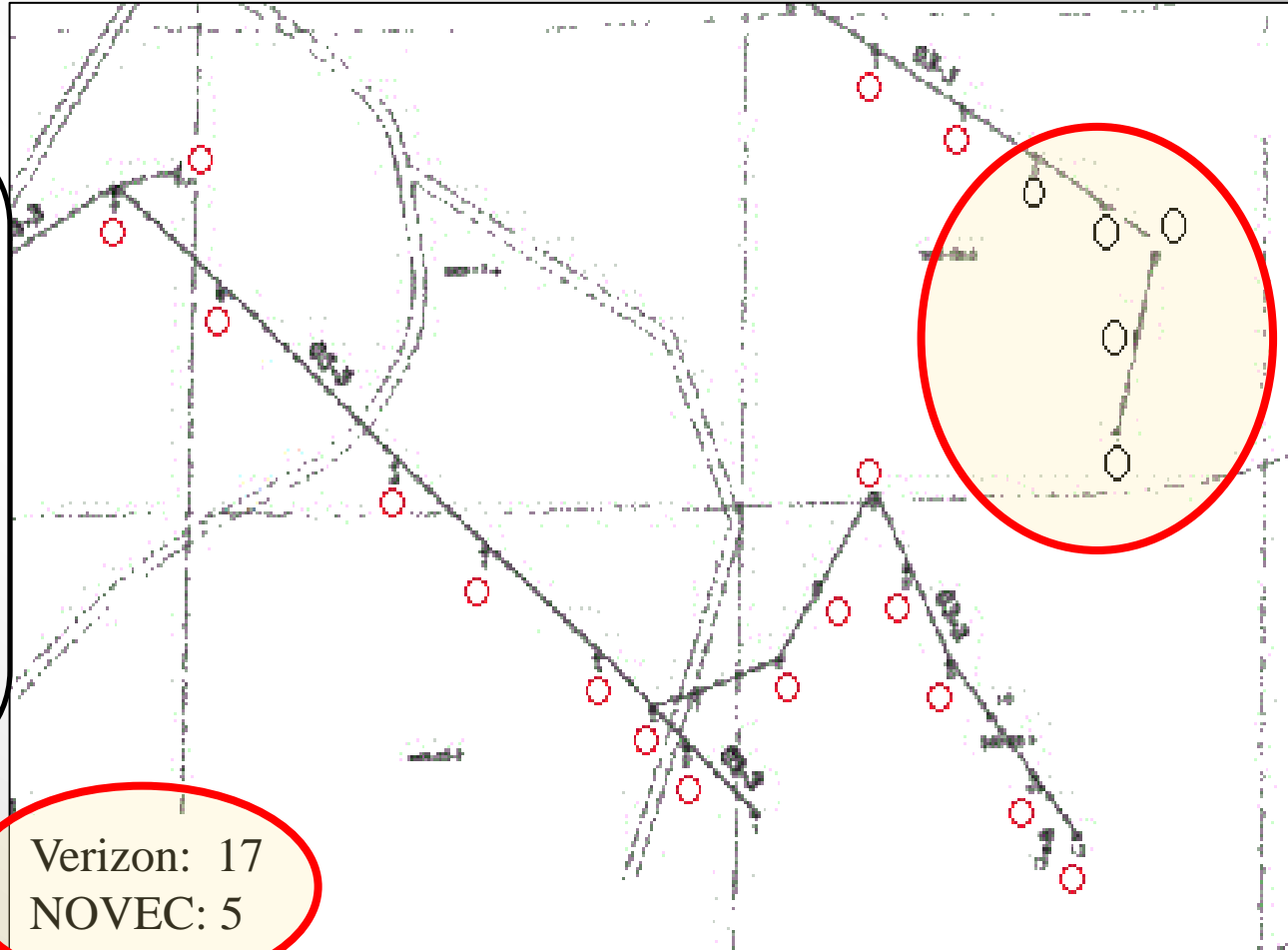
Prototype Solutions-
3PAA Discovery (Part II)

Video

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Prototype Solutions-
3PAA Compliance

Compliance / Review of Permit

Receive notification of discovered JUP

Initiate cost recovery process

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 3rd Party Attachments.

Software Labor Rates
Cost per Person-Month (Dollars) 13000
Calculate

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)

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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

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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

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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

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Questions?

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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

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NOVEC Make Ready Work Processes

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NOVEC IT Architecture

Our Area of Interest

Gap Analysis Findings- NOVEC
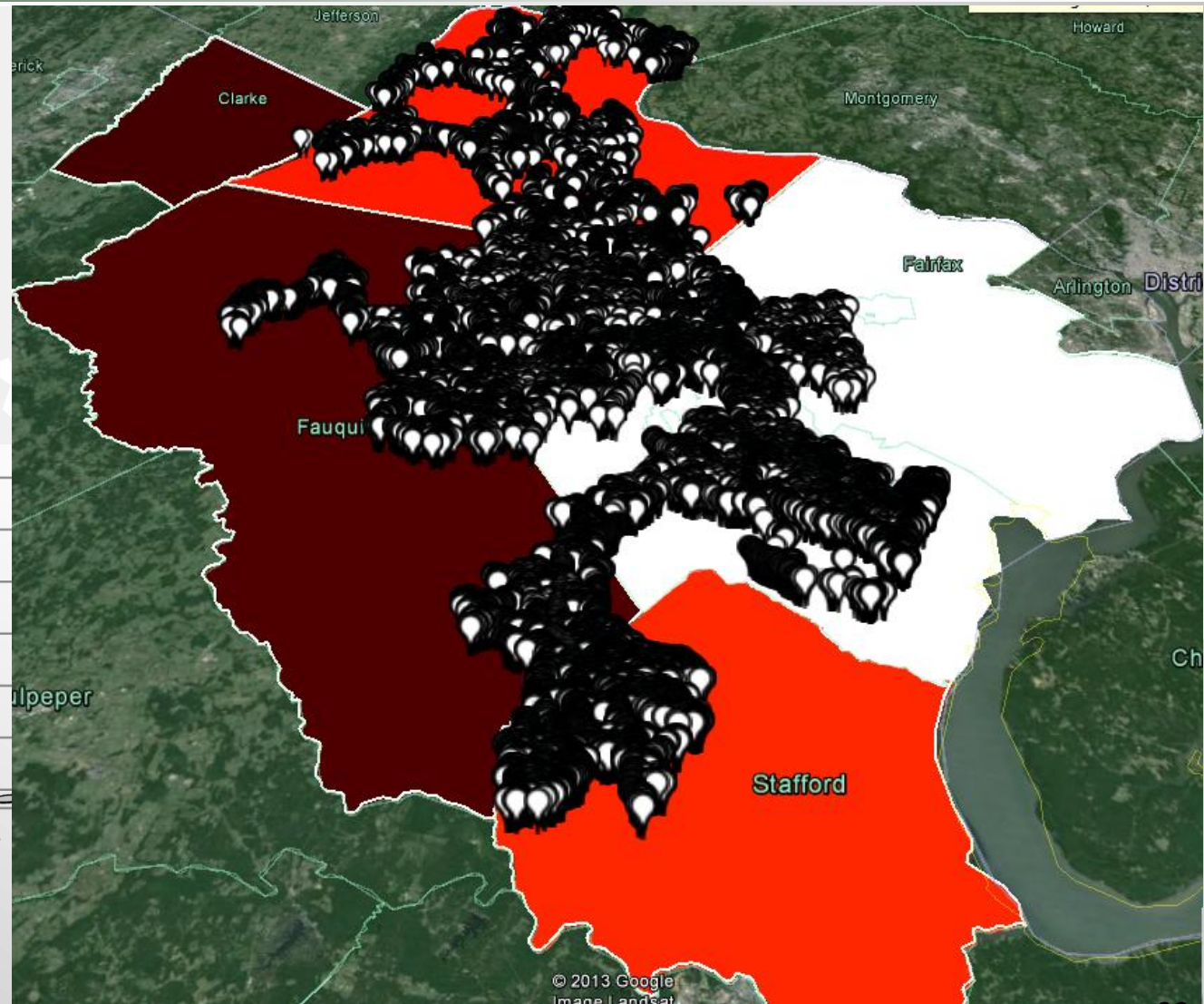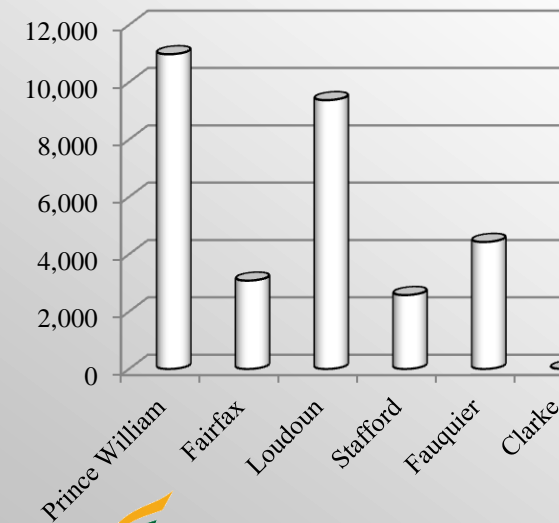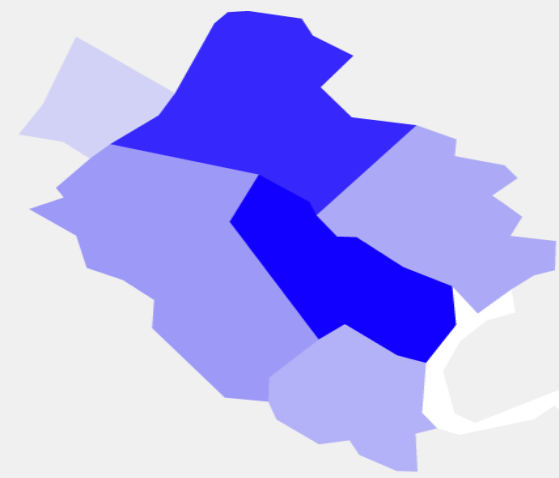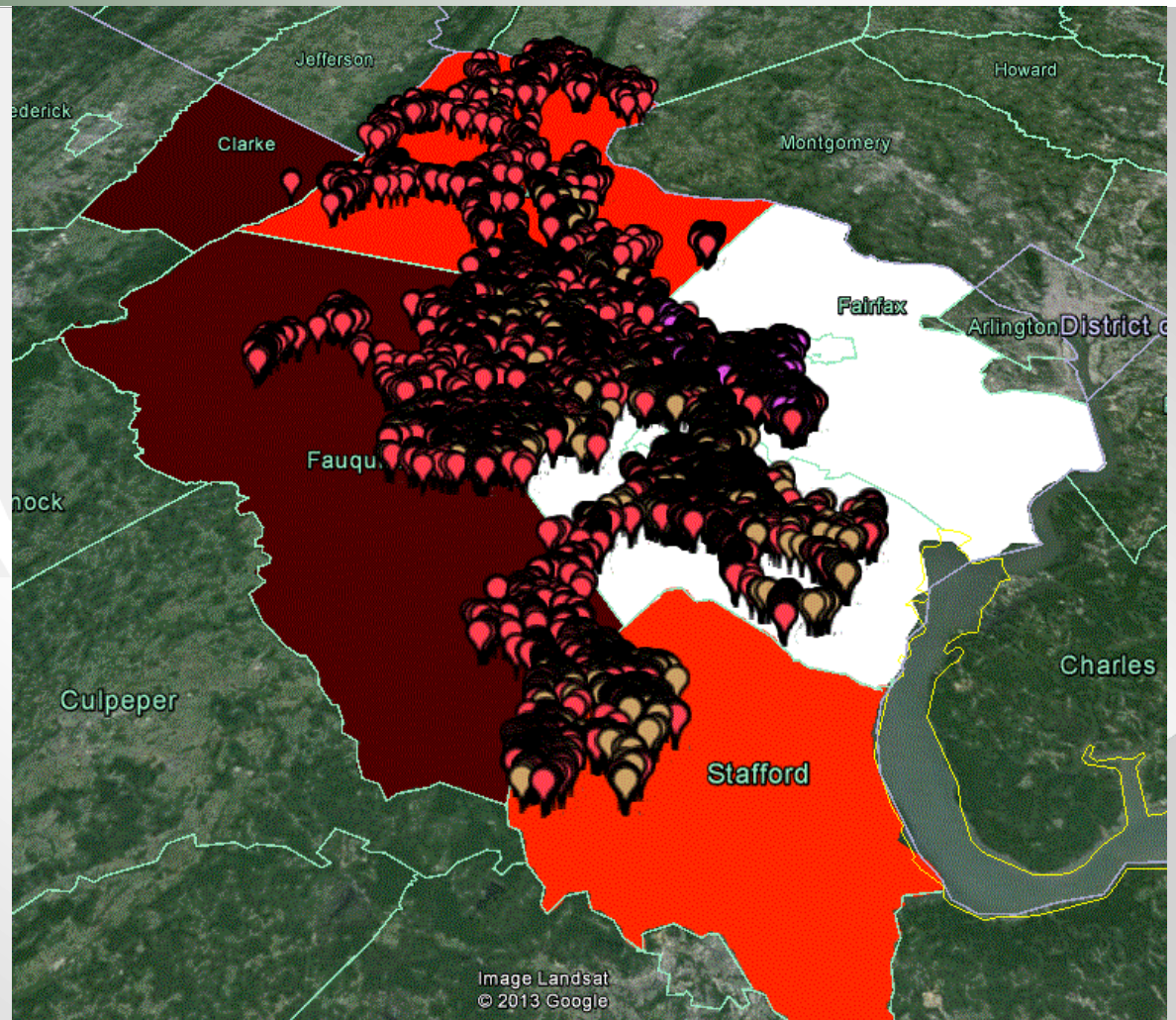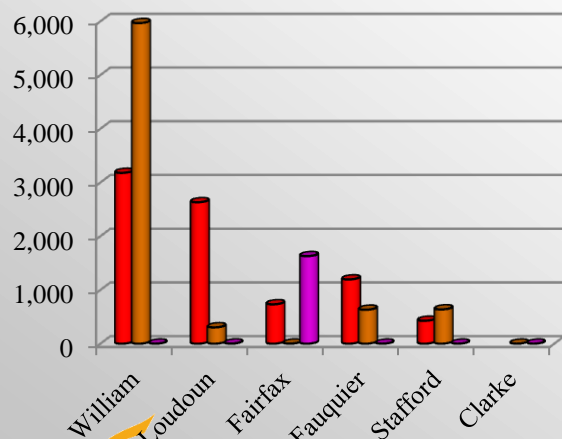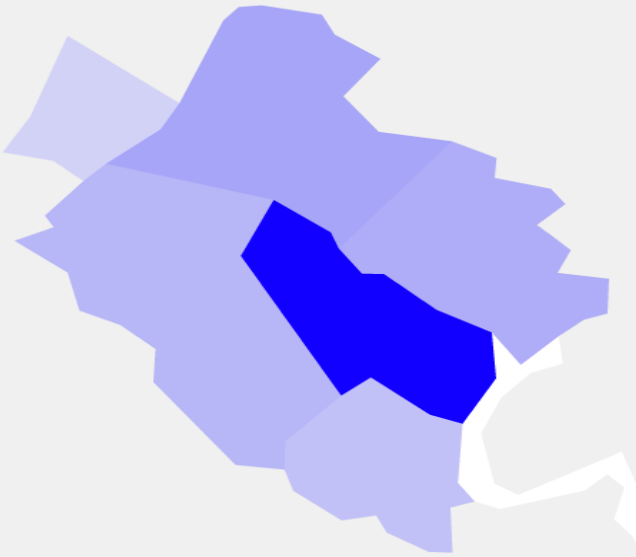
Legend:
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Gap Analysis Findings- Comcast

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Gap Analysis Findings- Cox

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