



Drone Surveys at the Puente Hills Landfill

IEGIS

Paul Biane Library

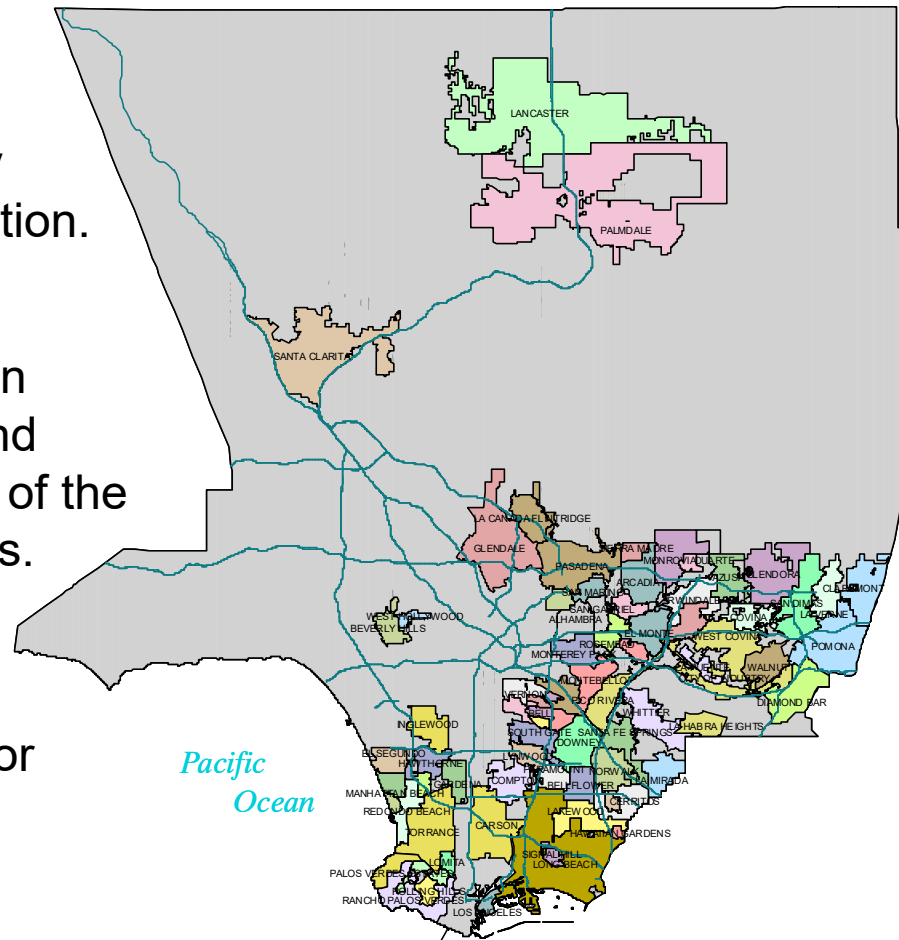
9/21/2017





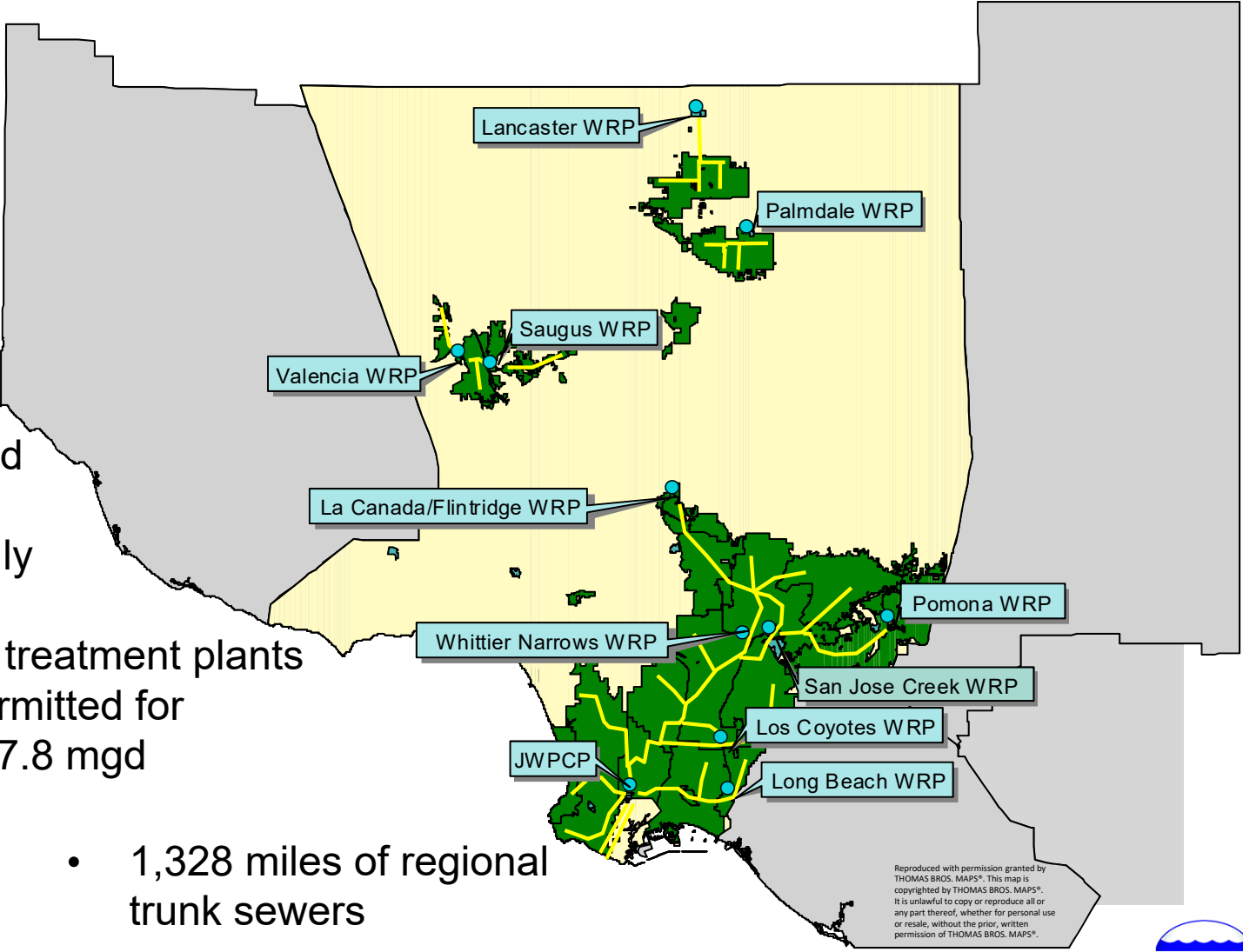
Sanitation Districts of Los Angeles County

- 25 separate Districts working cooperatively under joint administration.
- Provide water pollution control for 78 cities and unincorporated areas of the County of Los Angeles.
- Provide solid waste management needs for Los Angeles County.





Wastewater Collection & Treatment



- 192.2 mgd reused beneficially

- 11 treatment plants permitted for 627.8 mgd

- 1,328 miles of regional trunk sewers

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Solid Waste Management

KERN COUNTY

Transfer Stations/
Materials Recovery Facilities

1. South Gate
2. DART
3. Puente Hills MRF

Refuse-to-Energy Facilities

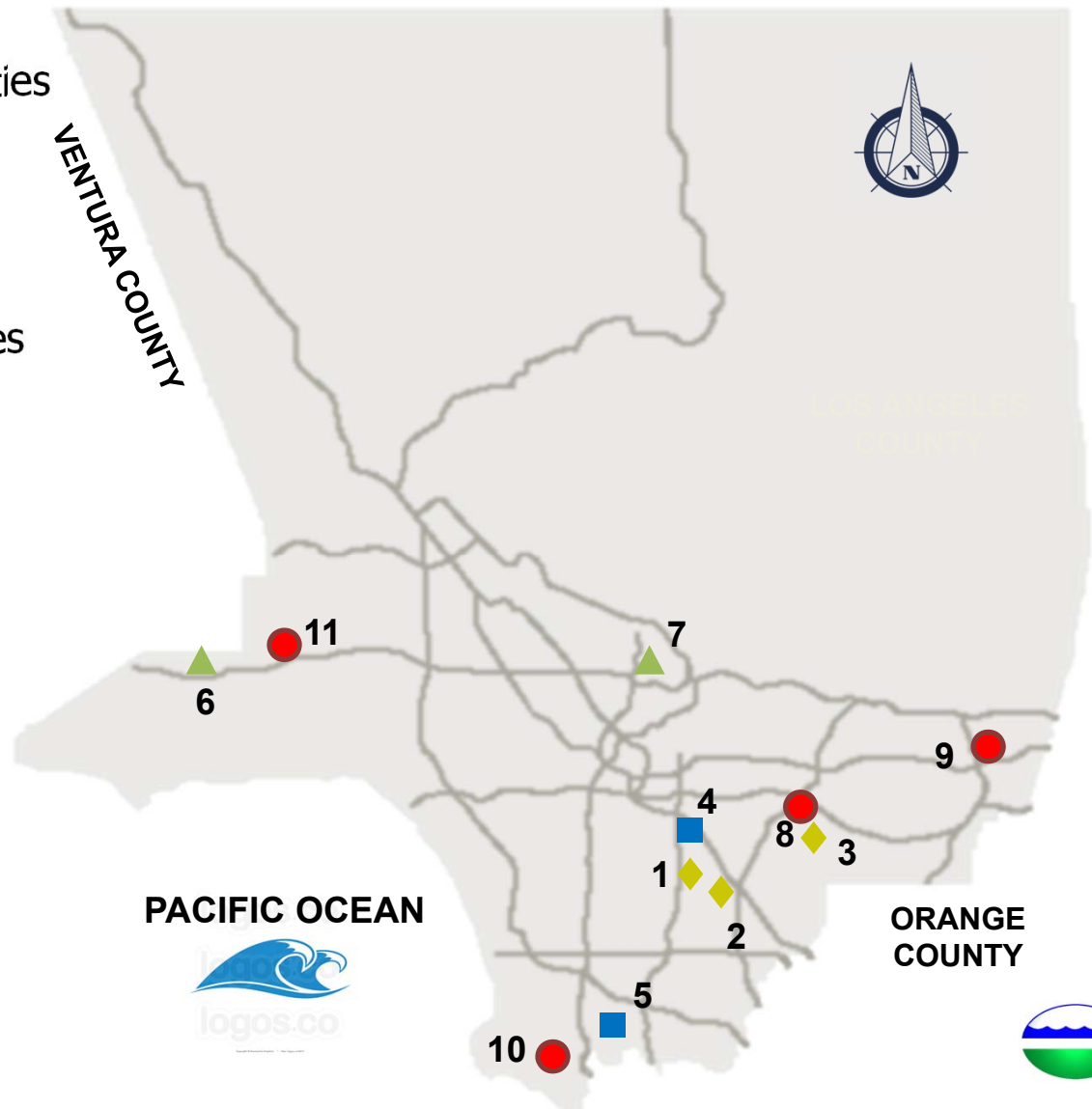
4. Commerce
5. SERRF

Active Landfills

6. Calabasas
7. Scholl Canyon

Closed Landfills

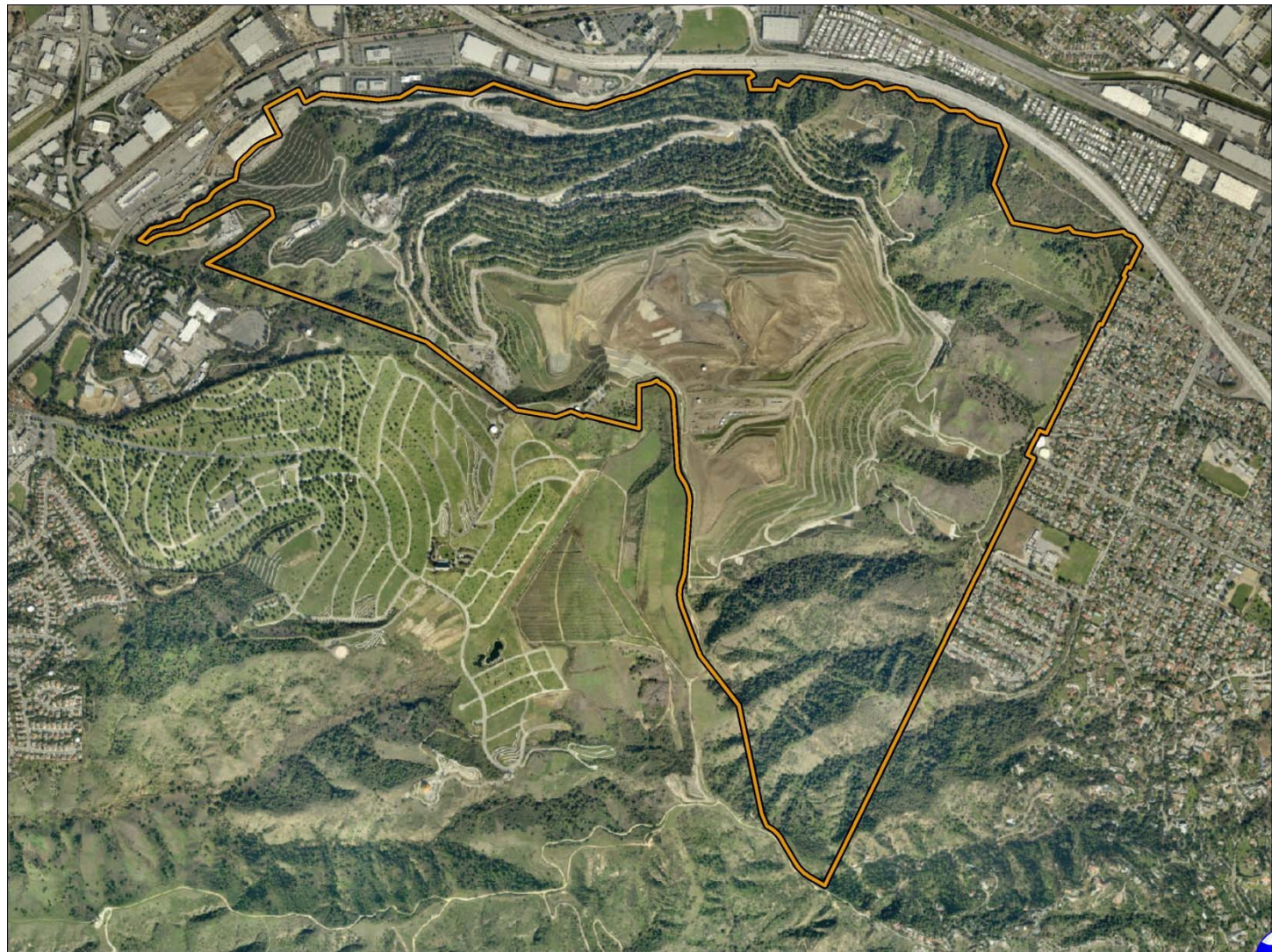
8. Puente Hills
9. Spadra
10. Palos Verdes
11. Mission Canyon





Puente Hills Landfill

October 31, 2013





Puente Hills Landfill Today





Puente Hills Regional Park





LACSD Drone Program

Equipment



Training & FAA Licensing



Photogrammetry Software





Equipment



DJI Phantom 4 Specs:

12.4 Megapixel Still – 4k Video

3 Axis Gimbal

Obstacle Sensory and Avoidance

Max Speed 45 mph

Max Elevation 19,685 Feet ASL

Max Battery Flight Time 28 Min.





Training & FAA Licensing

Training & Licensing:

Flight School

FAA License Exam Study Resources

FAA Part 107 License

- Required for Commercial or Government Aviation

- Good for 2 Years





Photogrammetry Software

Photogrammetry Software



Photogrammetry Software:

Uses Drone Imagery & Flight Data

Manages Drone Flight

Software Capabilities

- 3D Point Cloud Editing
- Survey Grade Accuracy with Ground Controls
- DSM & DTM
- Aerial Imagery
- Contours
- 3D Models

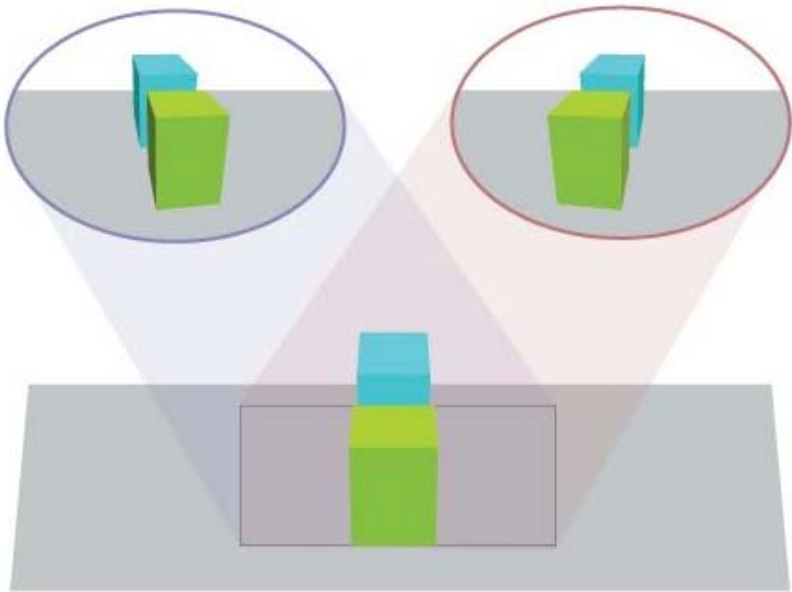




Science of Photogrammetry



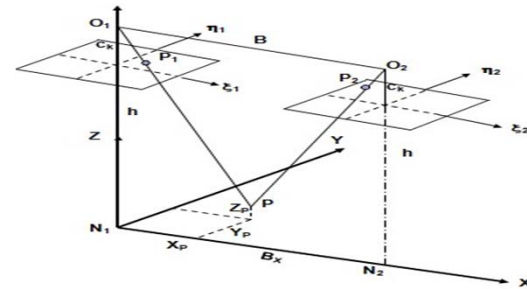
Parallax Effect





Traditional Photogrammetry

- Hard copy/soft copy stereoplotter
- Manual workflow with telescope, handwheels, and pedals
- Skilled operator



Top: Stereo pair diagram
Bottom: Stereo compiler working on a hard copy stereoplotter

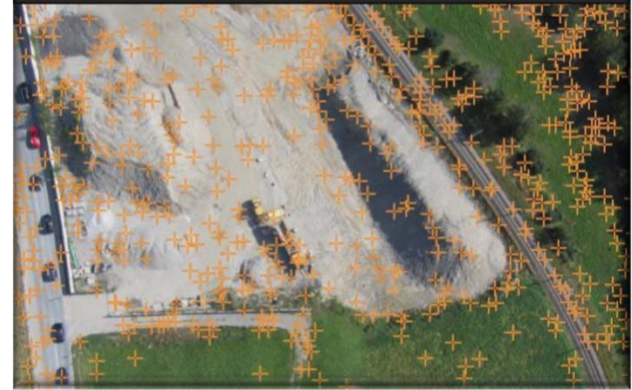




Automated Photogrammetry

- Software identifies the same pixel in overlapping images
- Calculates geometry of pixel in 3D space using Parallax method
- Develops a 3D point cloud of pixels

Unique RGB or CMYK Values



Same Pixel in Several Images





Puente Hills Buttress Fill

Video





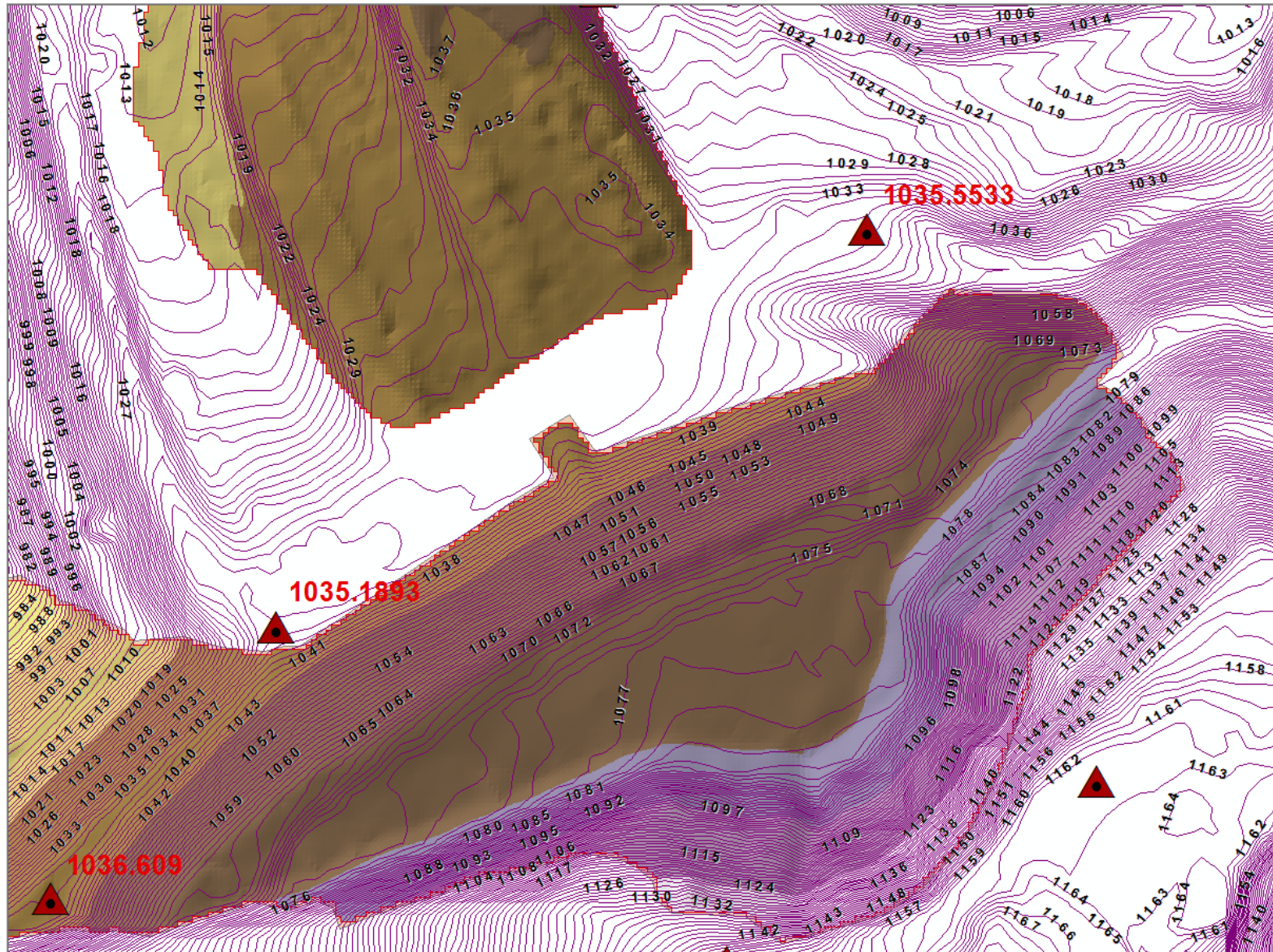
Landfill Applications

- Volume Calculations
- Grading, Construction & Fill Plans
- Settlement Analysis
- Develop GIS Infrastructure Mapping
- Drainage Studies





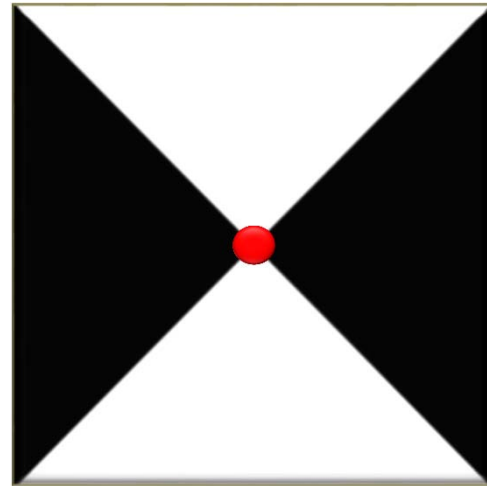
Volume Calculations





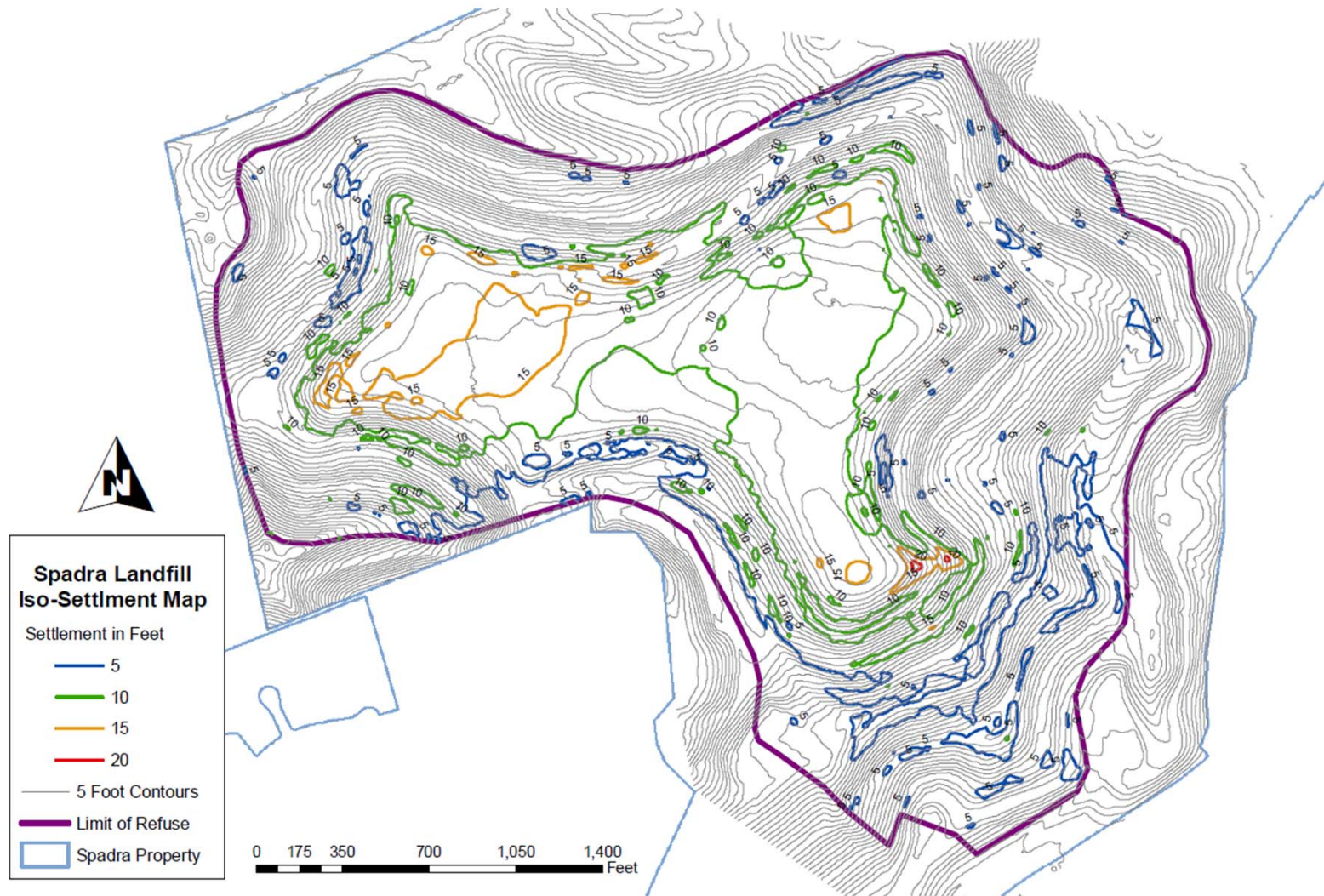
Ground Control Points

- Matte Finish
- Contrasting Colors
- 2 foot by 2 foot
- Pixel level contrasting center





Settlement Mapping





Landfill Infrastructure



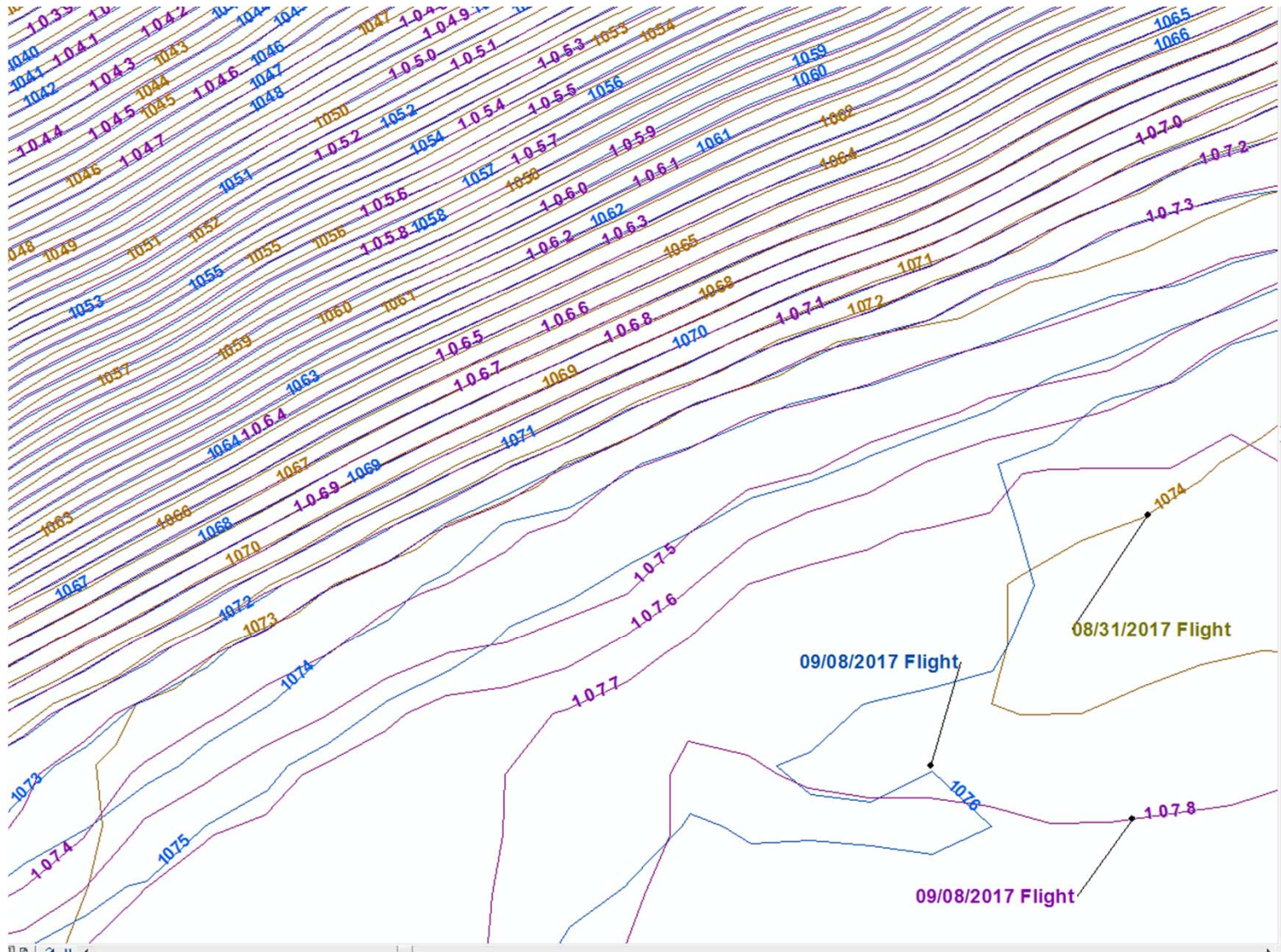


Drainage Studies





Repeatable Accuracy



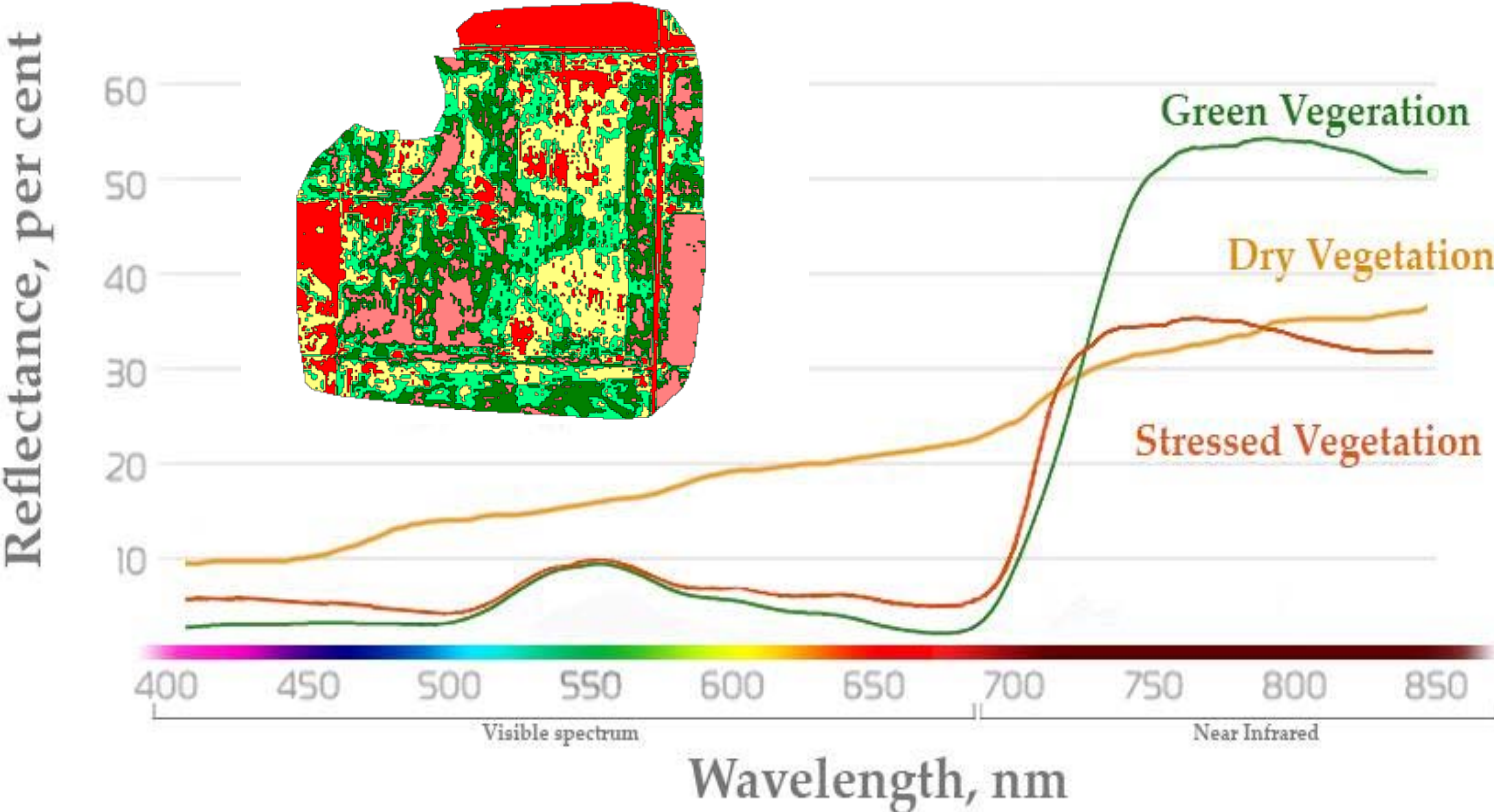


Future Applications

- Reflectance Mapping (Vegetation)
- Indoor Flights



Vegetation Mapping





That is it for Now!

Questions?