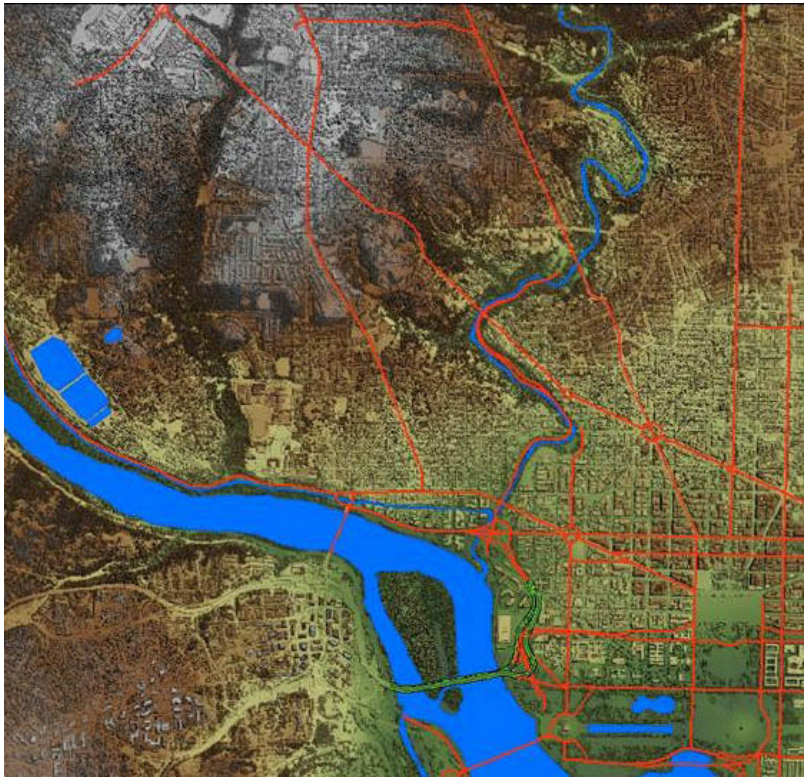
GIS Steering Committee Meeting
July 15, 2005

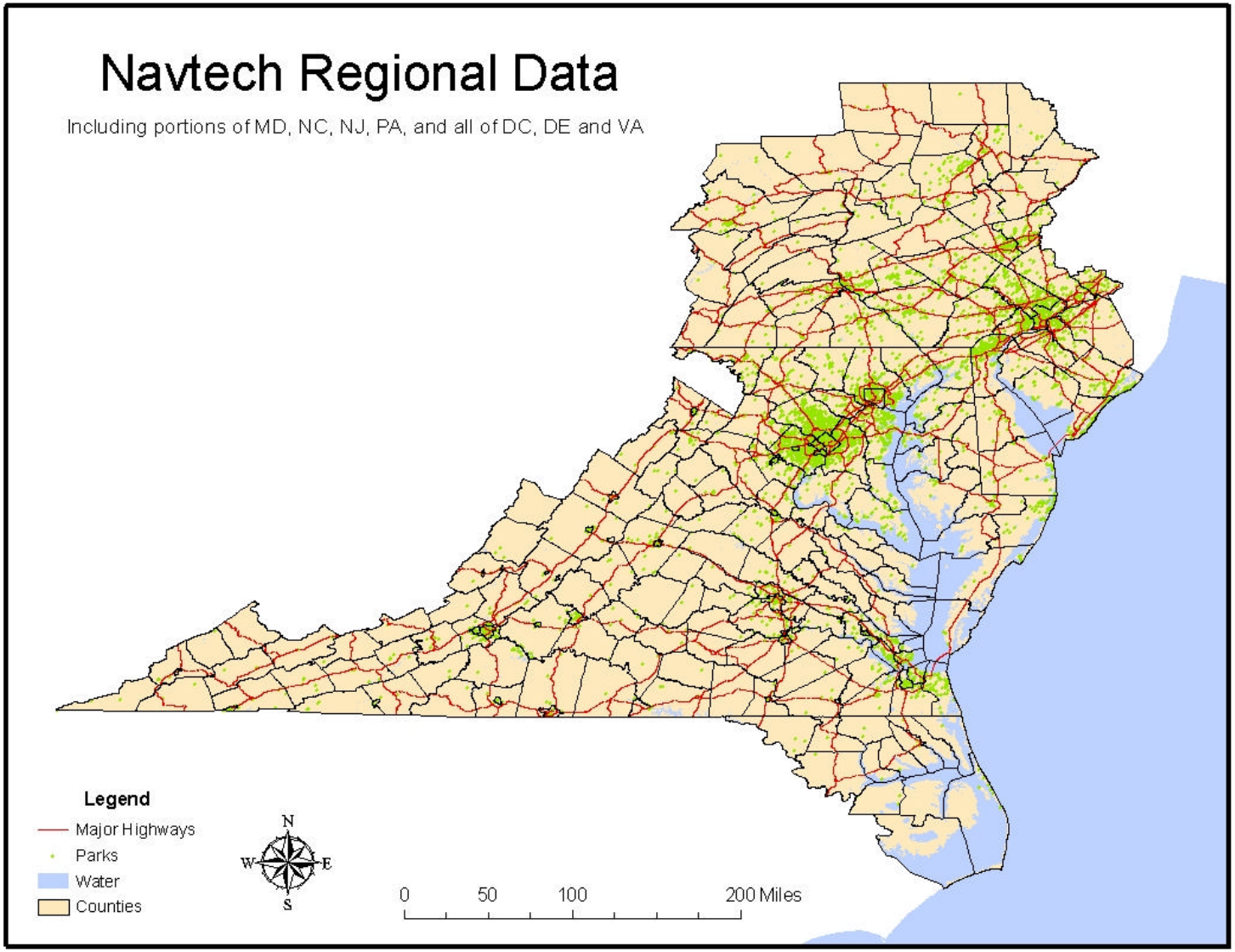
Barney Krucoff, GIS Director
Mario Field, Data Team Lead



Updated DC GIS Data

• CAMA Data	3/2005
• Places of Worship	4/2005
• Owner Points	4/2005
• Sale Points	4/2005
• Libraries	5/2005
• Embassies	5/2005
• Street Centerlines	5/2005
• Military Areas	5/2005
• NAVTEQ Regional Data	6/2005

Regional Data



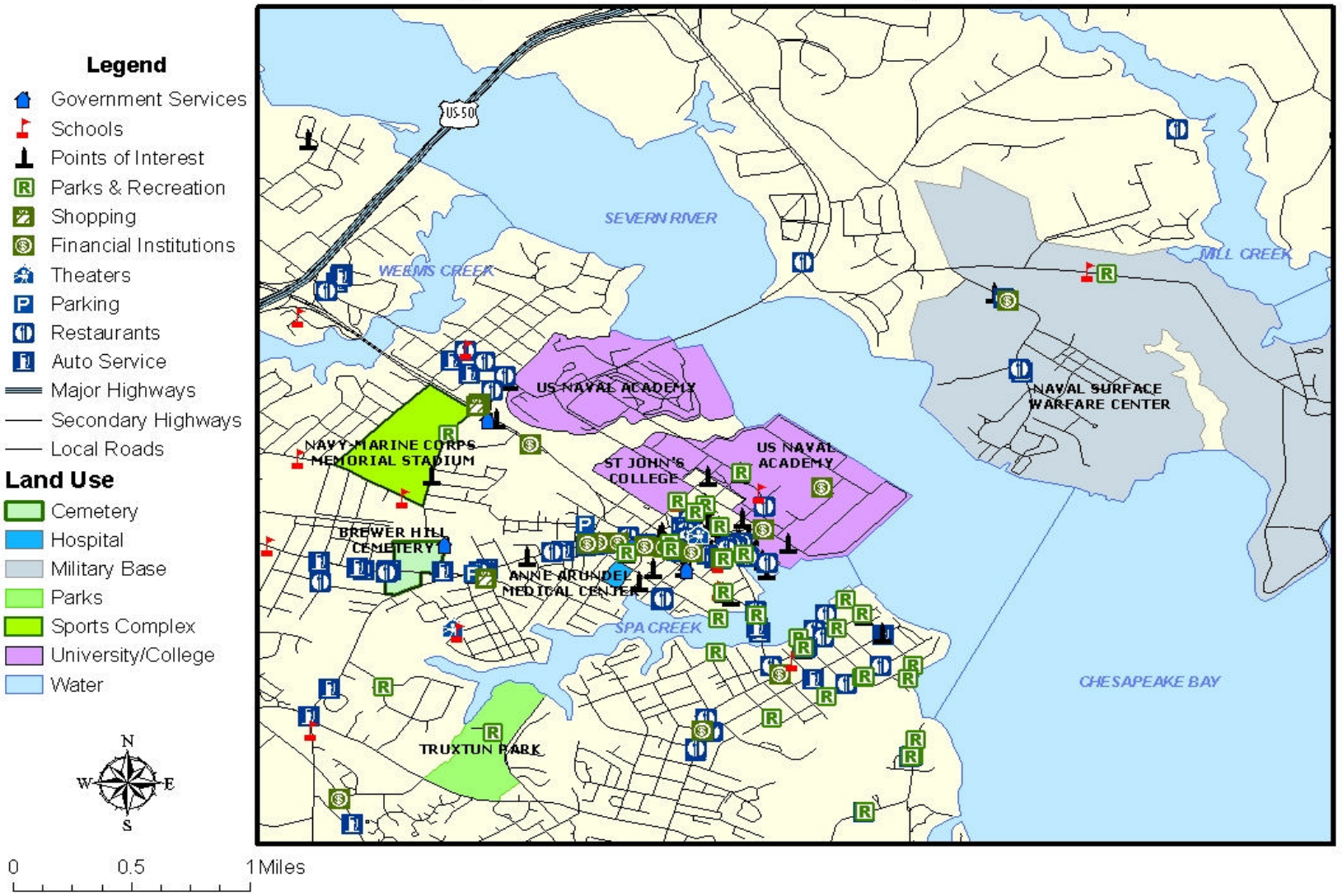
Regional Data

NAVTEQ data

- **31 feature classes**
- **Roads, Airports, Cemeteries, Golf Courses, Hospitals, Military Bases, Parks, National Monuments, Public Use Areas, Shopping Centers, Sports Complexes, University/Colleges, and woodlands**
- **Geographic Coordinate System – reproject with other DC GIS data**

Regional Data

Navtech Regional Data - Annapolis, MD



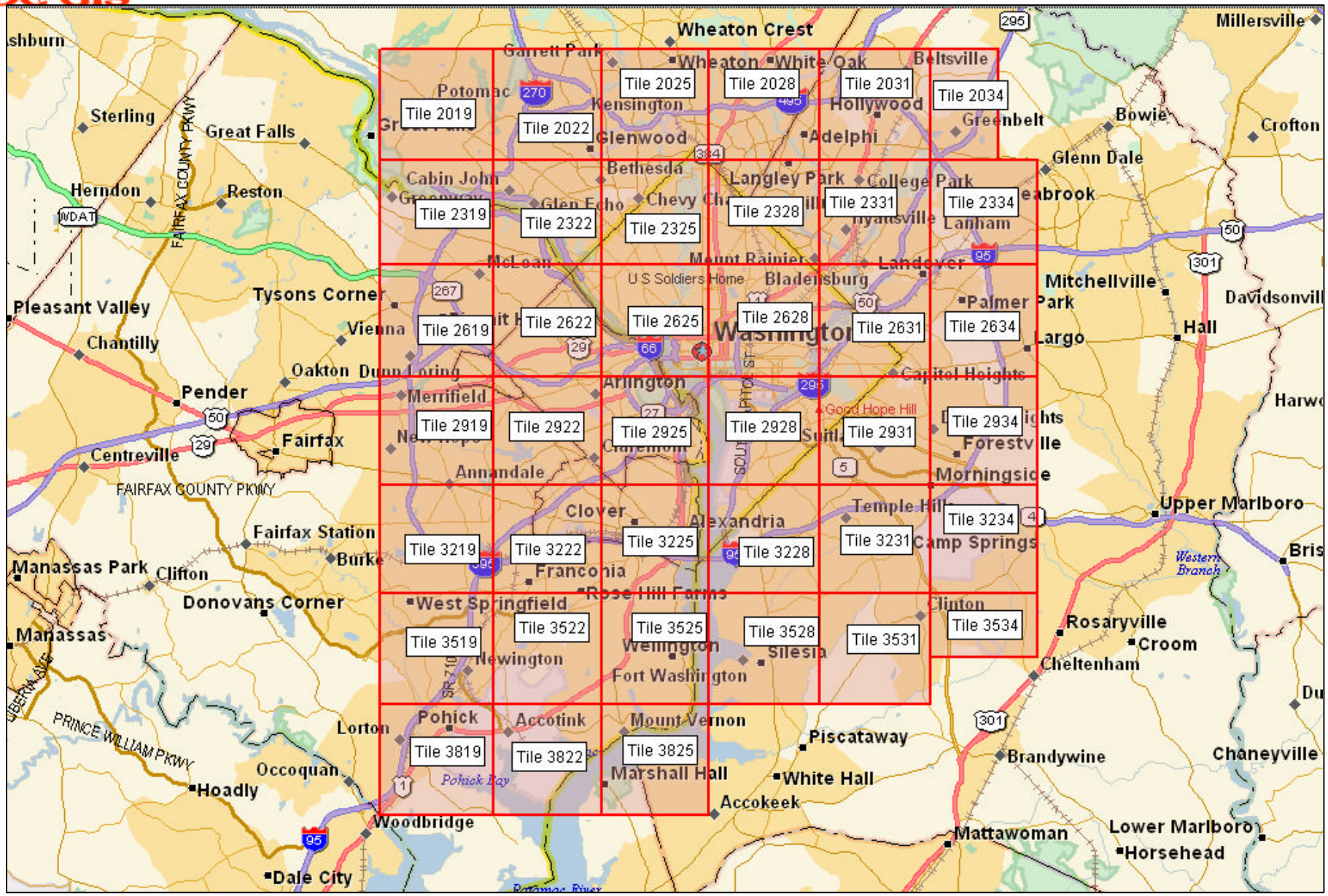
Current DC GIS Data Update

- **Address Points**
- **Zoning Data (Nyambi's Presentation)**
- **Aging Services**
- **Correctional Halfway House**
- **University Areas**
- **Businesses**
- **DC Quadrants**
- **DDOT-UFA Trees**
- **LIDAR Data**
- **Pictometry Data**
  - **» July 2005 publication**

LIDAR 2004

- Format – GeoTIFF
  - Digital Elevation Model (dem) – 32-bit floating point gridded matrix
    - First Return DEM – designated by a1
    - Last Return DEM – designated by a2
  - Intensity Image (int) – 8-bit
  - Color Coded Shaded Relief Image (clr) – 24-bit
  - Merged Intensity-Color Coded Shaded Relief Image (mrg) – 24-bit
  - 1-meter gridded bare earth DEM (32-bit GeoTIFF)
- Resolution – 1 meter for all files
- Flown – October 2004
- Projection – Universal Transverse Mercator (UTM)
- Datum – World Geodetic System 1984 (WGS84) G1150 ellipsoid for both the horizontal and vertical datum (not Mean Sea Level)
- Accuracies – approximately 0.5 meter CE90 absolute horizontal and 0.3 meter LE90 absolute vertical
- Distribution – District Government Only, USGS 3M resample for public coming

LIDAR 2004


Tile 2019
Tile 2022
Tile 2025
Tile 2028
Tile 2031
Tile 2034
Tile 2319
Tile 2322
Tile 2325
Tile 2328
Tile 2331
Tile 2334
Tile 2619
Tile 2622
Tile 2625
Tile 2628
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Tile 2919
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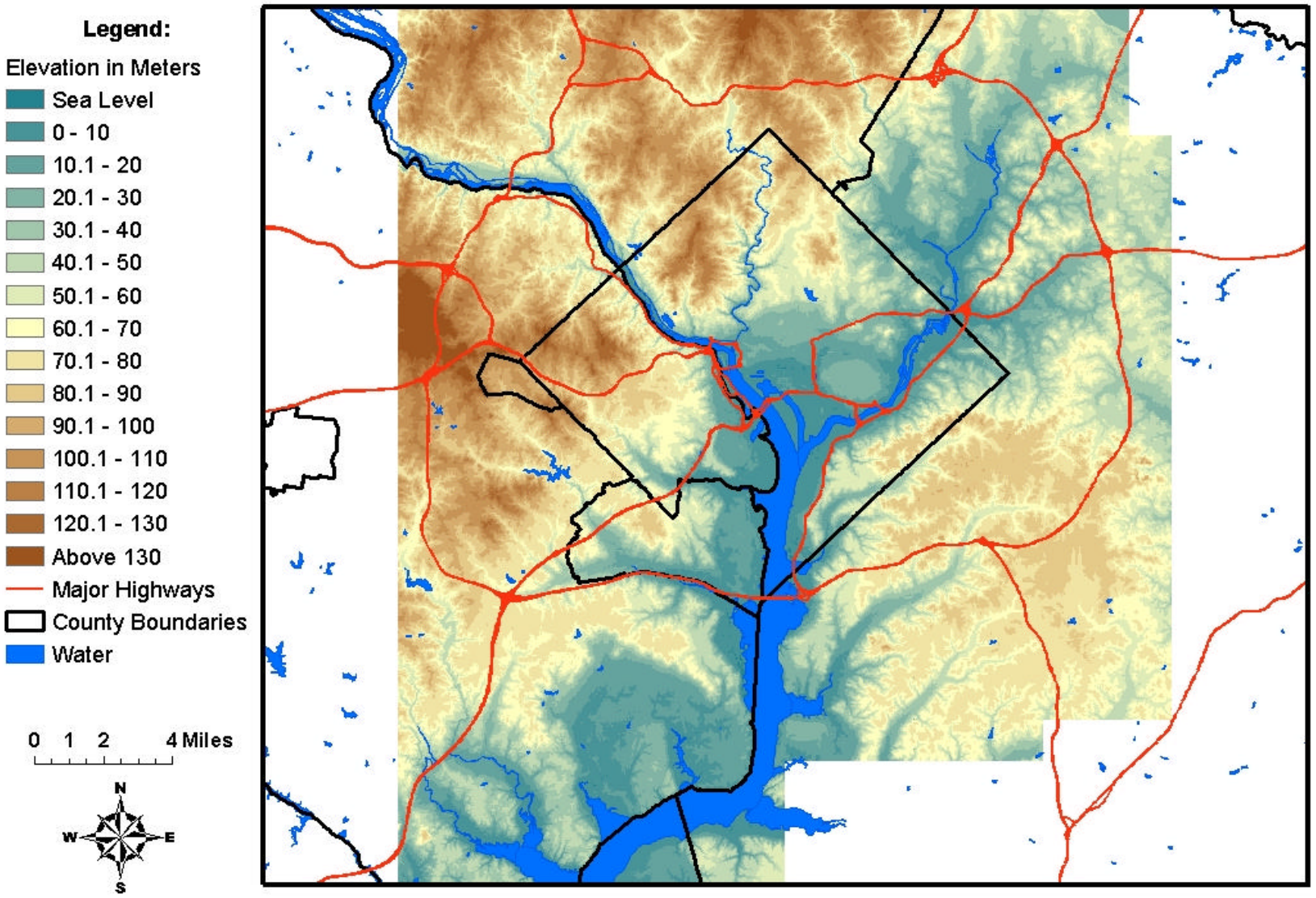
Tile 2931
Tile 2934
Tile 3219
Tile 3222
Tile 3225
Tile 3228
Tile 3231
Tile 3234
Tile 3519
Tile 3522
Tile 3525
Tile 3528
Tile 3531
Tile 3534
Tile 3819
Tile 3822
Tile 3825
Wheaton Crest
Garrett Park
Wheaton
White Oak
Beltsville
Potomac
Kensington
Hollywood
Greenbelt
Bowie
Crofton
Millersville
Sterling
Great Falls
Glenwood
Adelphi
Glenn Dale
Herndon
Reston
Bethesda
Cabin John
Langley Park
College Park
Lanham
Mount Rainier
Landover
McLean
U S Soldiers Home
Bladensburg
Mitchellville
Davidsonville
Pleasant Valley
Tysons Corner
Vienna
Palmer Park
Largo
Hall
Chantilly
Oakton
Dunn Loring
Merrifield
Arlington
Capitol Heights
Good Hope Hill
Pender
Fairfax
Centreville
Annandale
Morningside
Forestville
Upper Marlboro
Clover
Alexandria
Temple Hills
Camp Springs
Fairfax Station
Burke
Manassas Park
Clifton
Donovans Corner
Franconia
Rose Hill Farms
West Springfield
Clinton
Rosaryville
Croom
Manassas
Newington
Wellington
Silesia
Fort Washington
Cheltenham
Pohick
Accotink
Mount Vernon
Lorton
Piscataway
Brandywine
Chaneyville
Occoquan
Hoadly
Marshall Hall
White Hall
Accokeek
Woodbridge
Mattawoman
Lower Marlboro
Horsehead
Dale City
FAIRFAX COUNTY PKWY
PRINCE WILLIAM PKWY
Pohick Bay
Potomac River
Western Branch

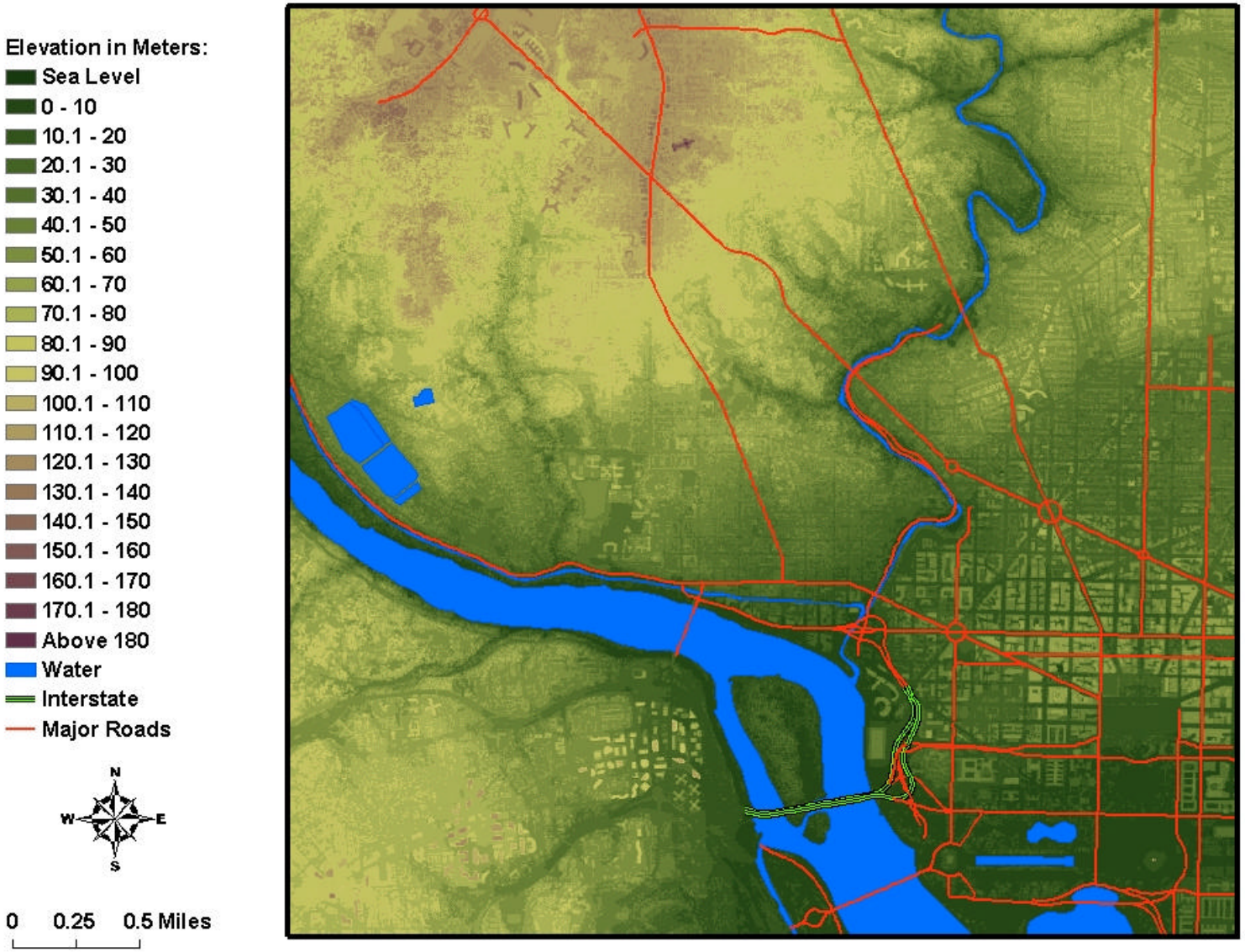
LIDAR 2004

LIDAR - Bare Earth



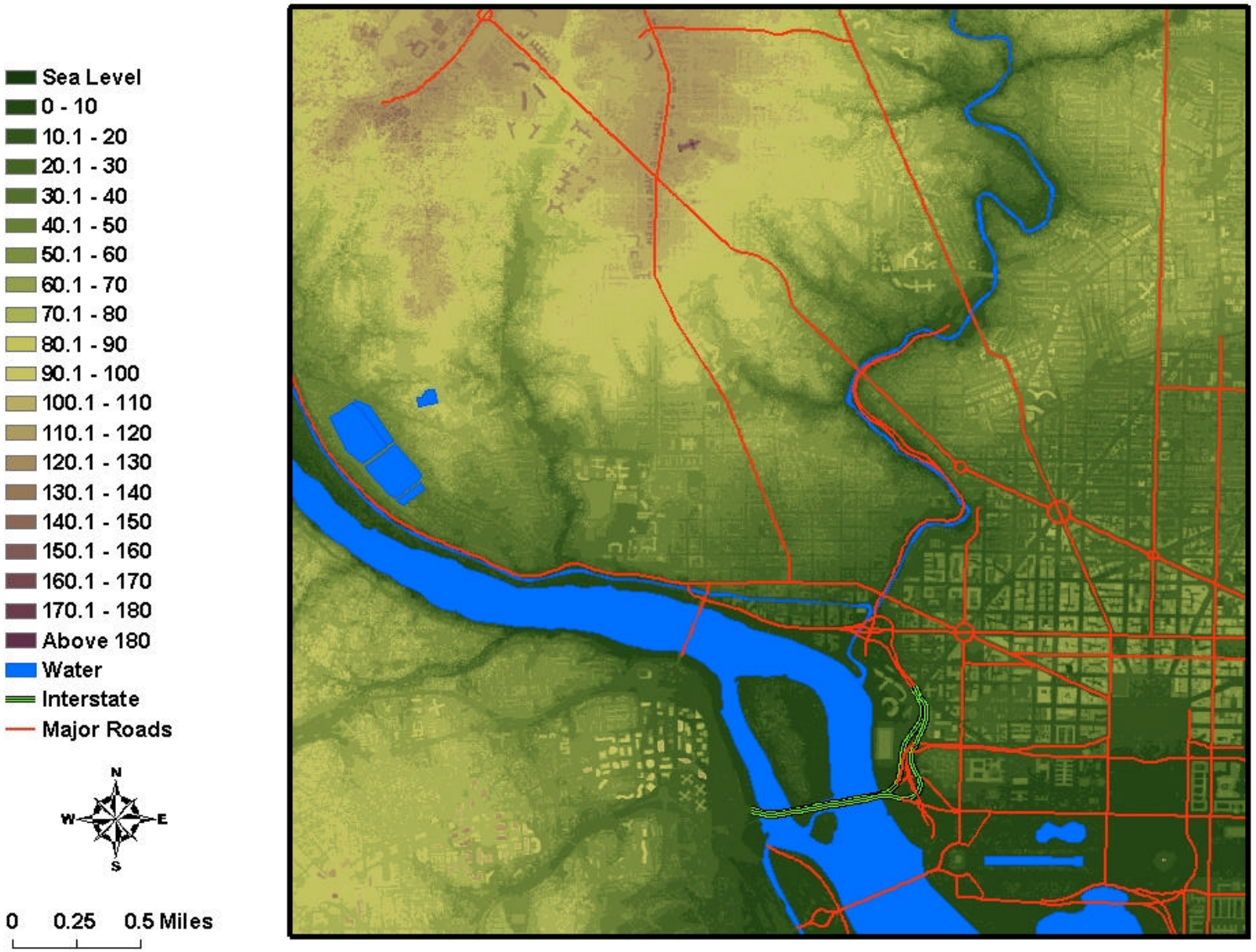
LIDAR 2004

LIDAR - First Return DEM



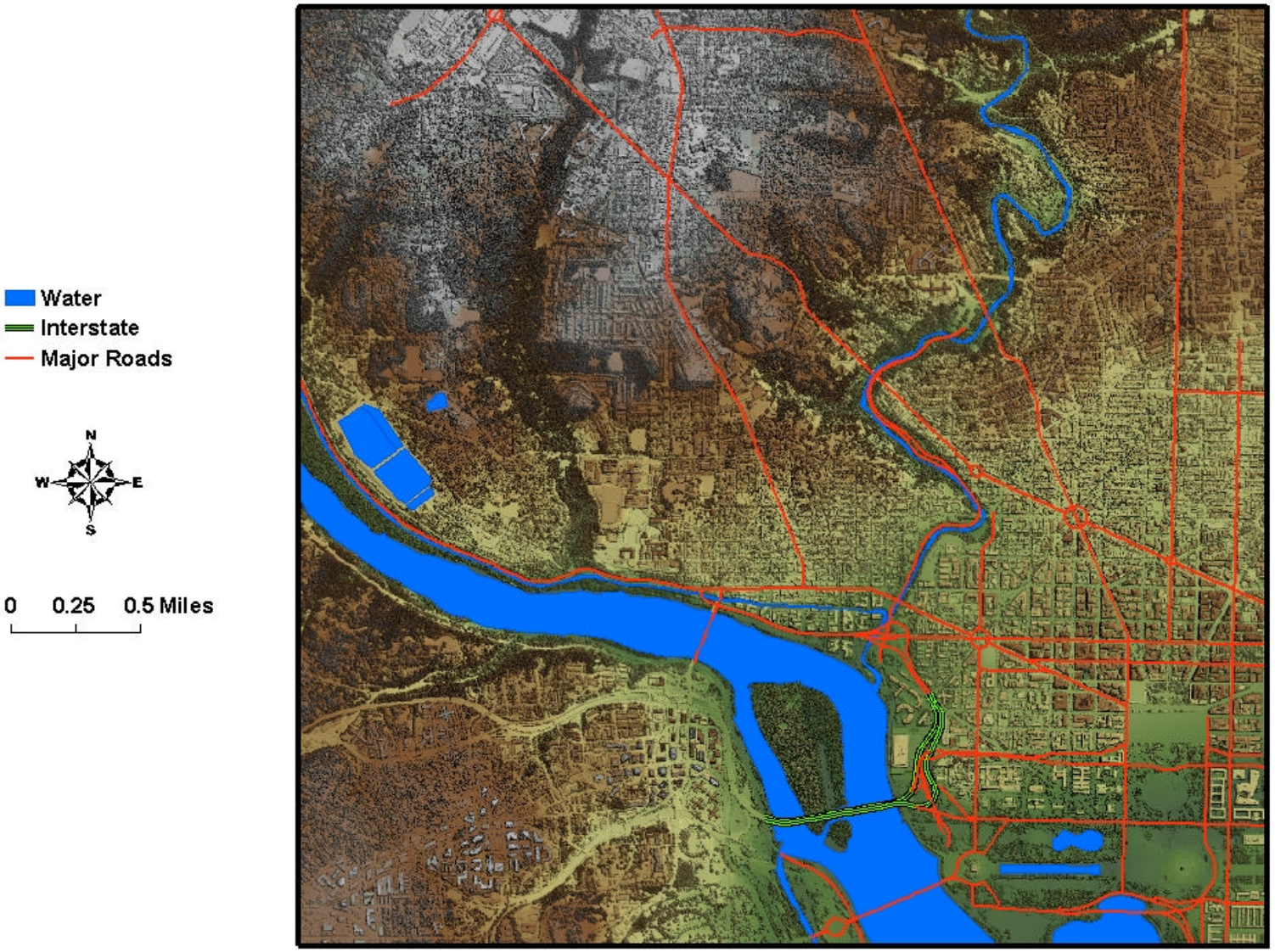
LIDAR 2004

LIDAR - Second Return DEM



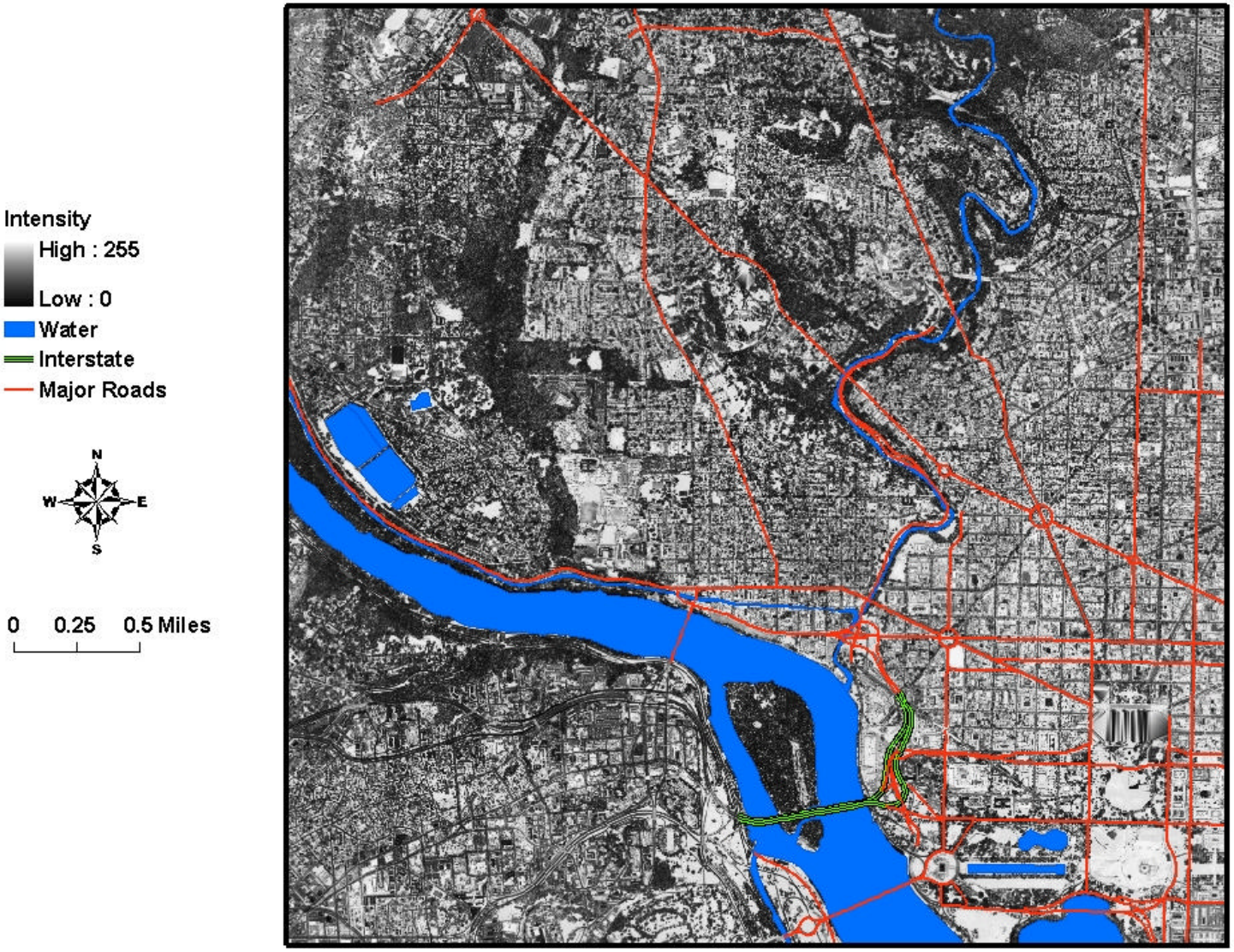
LIDAR 2004

LIDAR - Color Coded Shaded Relief



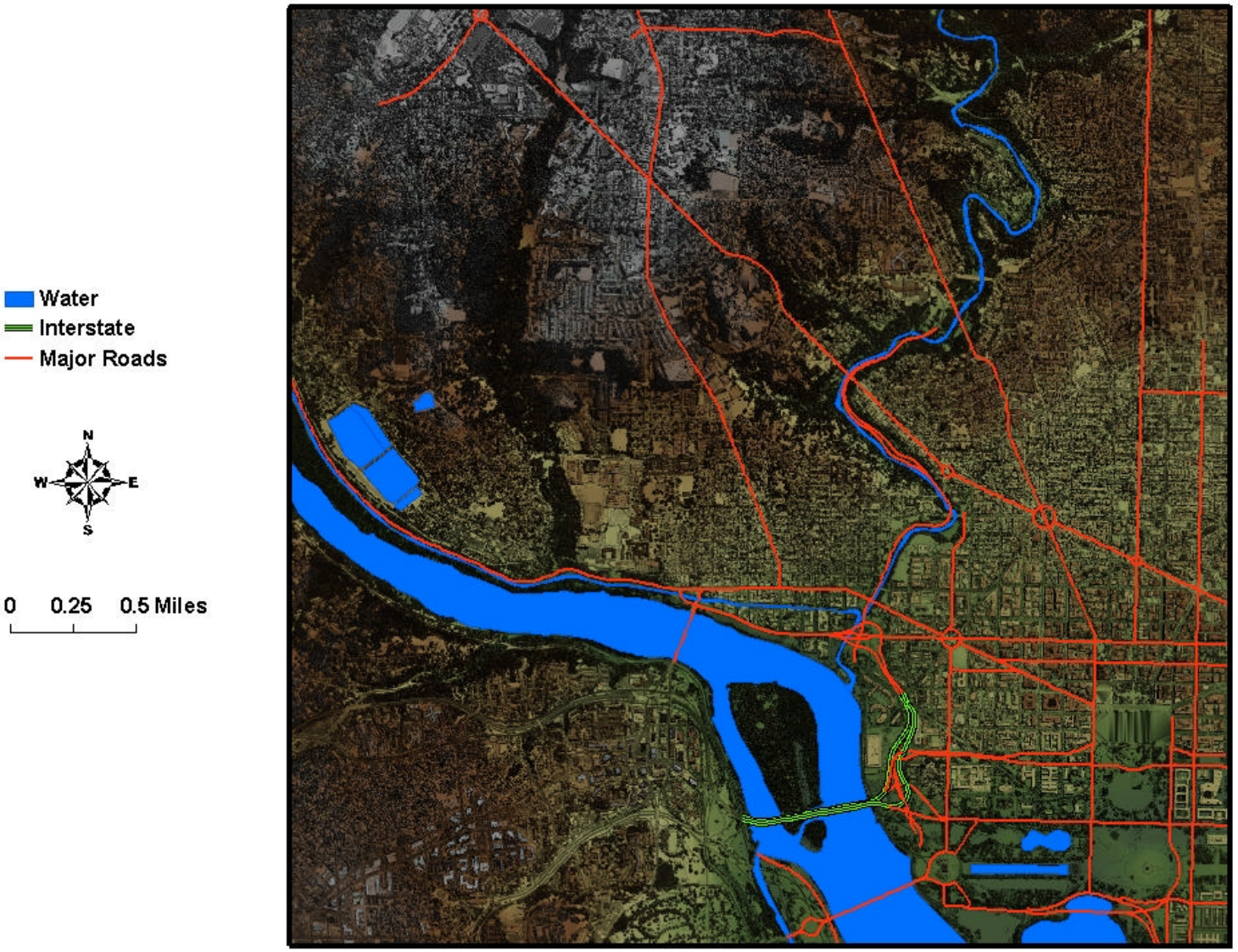
LIDAR 2004

LIDAR - Intensity



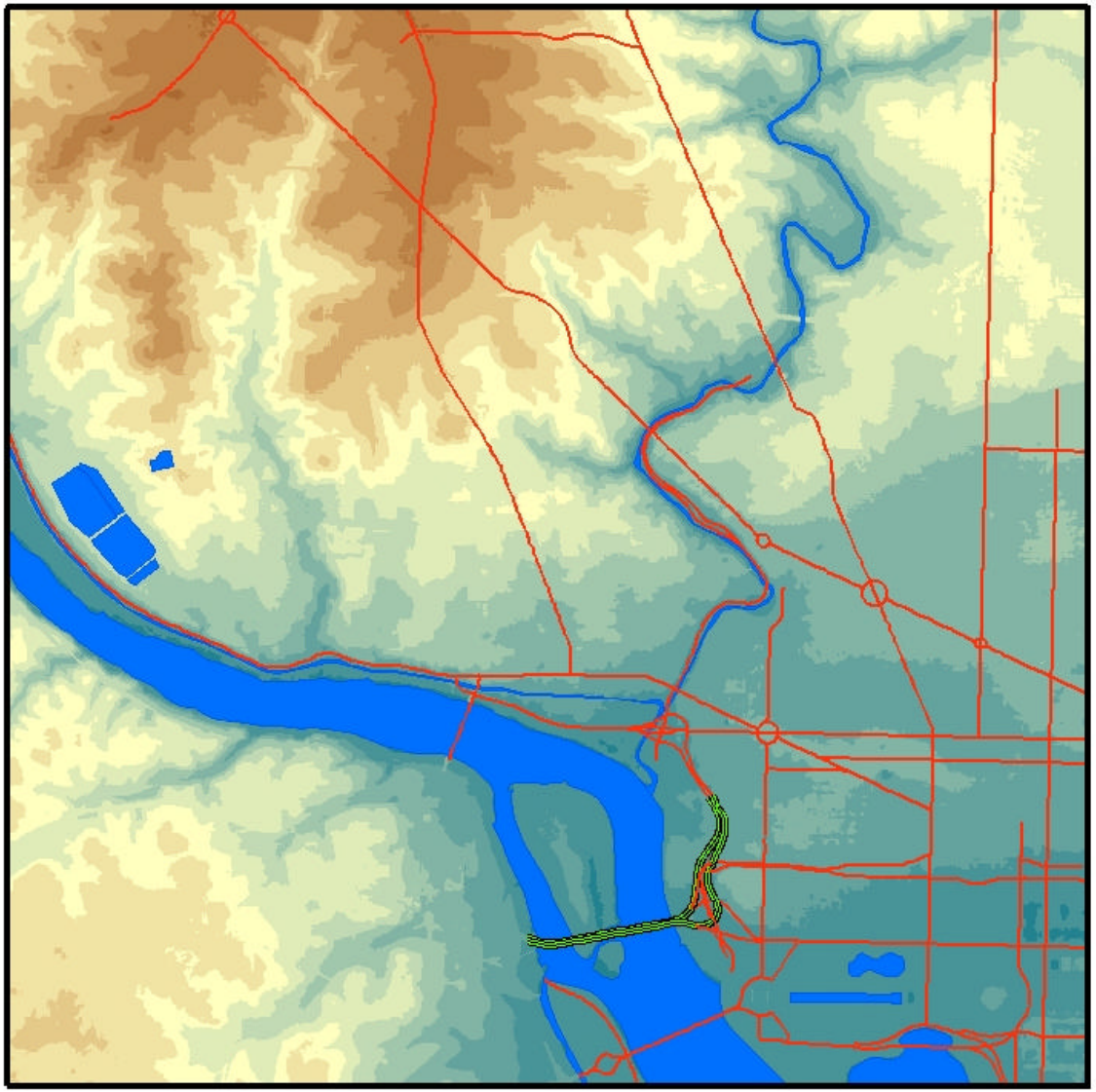
LIDAR 2004

LIDAR - Merged Intensity & Color Coded Shaded Relief



LIDAR 2004

LIDAR - Bare Earth



LIDAR 2004

Applications

- Terrain Mapping and Analysis
- Site Planning
- Viewshed Analysis
- Forest Management
- Environmental Monitoring
- Watershed Studies
- Flood Plain Mapping
- Source for 3D Urban Mapping

Pictometry

Pictometry

- Flown March 22, 2005
- EFS 2.6 Version 3
  - Improved GIS file performance
  - Spatial Indexing
  - New Navigation Tools
  - New DRG scans
- Training/PR - August 11, 2005, 9:30AM @ OJS (preliminary)
- Sector orthos delivered at time of training
- Distribution: Digital Data District only, hard copy and PDF public.

Master Address Repository WEB SERVICE DEMONSTRATION

Master Address Repository

- **Coming 1st week of August (or very close)**
- **Last meeting**
  - **Difference between address points and owner points**
  - **Desktop tools**
    - **Maintenance Application (DCRA)**
    - **Batch Tool**
    - **ArcGIS Plug-in (Coming with OP Tools)**
- **Related improvements to the Street Spatial Database**
  - **Additional streets**
  - **Updated address ranges**
    - **Actual**
    - **Theoretical**

What is still being worked on

- **Campuses (Federal and University)**
- **Place Names**
- **Public Housing**
- **Zip Plus + 4**
- **Intersection Table, Block Table**
- **Anomaly Checking**
- **Web Services Development and Testing**

MAR Web Services

- **Many MAR Web Services**
  - **Address Service**
  - **Intersection Service**
  - **Block Service**
  - **AID Service**
  - **SSL Service**
  - **Place Name Service**
  - **Wrapper Services**
    - **Inside DC Locations (All above except SSL)**
    - **Inside or Outside DC Addresses and Intersections Only**
  - **Tracking and Error Reporting Web Page**

Verify DC Address -- 1

- The Verify DC Address operation parse, standardize, and verify an DC address. The MAR VW_ADDRESS view will be used for verification.
- Address number and street name are required.

Verify DC Address -- 2

- General Process
  - Strip out non-alphanumeric characters except “’”, “/”
  - Whole string search look for exact match
  - Parse components
  - Standardize street type and quadrant
  - Standardize street name
    - Search street name lookup
    - Search street alias lookup
    - Search similar street name
    - Spell check
  - Search address number/suffix and street name
  - Match street type
  - Match quadrant
  - Calculate confidence level
  - Return candidate(s)

Verify DC Address -- 3

- Accepts
  - One concatenated address string
  - Five address components (address number, address number suffix, street name, street type, and quad)
- Returns (for each candidate)

Address Information
- **Standardized full address**
- **AID**
- **Address Number**
- **Address Number Suffix**
- **Street Name**
- **Street Type**
- **Quadrant**
- **Zip Code + Plus 4**
- **SSL (discuss)**
- **Block Name**
- **Status**

Confidence Level
- **Score**

Geographic Information
- **ANC**
- **Neighborhood Cluster**
- **Voting Precinct**
- **Police Service Area**
- **Police District**
- **Police Regional Office**
- **Census Tract**
- **SMD**
- **Ward**
- **Neighborhood**

Coordinates
- **X, Y coordinates**
- **USNG**

Link to reporting/tracking web page

Verify DC Address -- 4

- Also Returns
  - Verification explanation
  - Example:

Component	Parsed & Normalized	Assessment
Street Type	STREET	Valid
Quad	NW	Valid
Street Name	4TH	Valid
Address Number/Street Name	441 4TH	Valid
Address Number/Street Name/Street Type	441 4TH STREET	Valid
Full Address	441 4TH STREET NW	Verified

Confidence Level Calculation

- Each returned address string will be compared with the user entered string to get the confidence level for that record.
- Assigned weight to each address component.
- Calculate the closeness of each address component by edit distance algorithms (based on similar characters, transpositions)
- The formula below will then be used to get the confidence level for each return record.
- Confidence Level = 0.4 * score_addressIDSuffix + 0.3 * score_streetName + 0.15 * score_streetType + 0.15 * score_Quad

Component	Weight
Address Number & Address Number Suffix	0.4
Street Name	0.3
Street Type	0.15
Quadrant	0.15

Spell Checker

- A spell checking engine called NetSpell.
- NetSpell's suggestions for a misspelled word are generated using phonetic (sounds like) matching and ranked by a typographical (looks like) score.
- NetSpell's dictionaries are based on the OpenOffice Affix compression format. We created our own en-DC.dic, the DC street names dictionary from the street name lookup table. Place names still need to added to the dictionary.

Verify DC Intersection -- 1

- The Verify DC Intersection operation parse, standardize, and verify an DC Intersection. The MAR VW_INTERSECTION (In the creating process) view will be used for verification.
- “AND” or “&” are required.

Verify DC Intersection -- 2

- General Process
  - Strip out non-alphanumeric characters except “’”, “/”, “&”
  - Whole string rough search
  - Parse components
  - Standardize street types and quadrants
  - Standardize street names
    - Search street name lookup
    - Search street alias lookup
    - Search similar street name
    - Spell check
  - Search the two street names
  - Match street type
  - Match quadrant
  - Calculate confidence level
  - Return records

Verify DC Intersection -- 3

- **Accepts**
  - One concatenated intersection string (contains “&” or “AND”)
  - Two streets

- **Returns (2)**
  - Standardized intersection names
  - Intersection ID
  - Street ID
  - Cross street ID
  - Standardized full street
  - Street Name
  - Street Type
  - Street quadrant
  - Standardized full cross street
  - Cross street name
  - Cross street type
  - Cross street quadrant
  - X,Y coordinates
  - Confidence Level
  - USNG

Verify DC Block -- 1

- The Verify DC Block operation parse, standardize, and verify an DC block. The MAR VW_BLOCK (from DDOT) view will be used for verification.
- “BETWEEN” and “AND” or “&” are required.

Verify DC Block -- 2

- General Process
  - Strip out non-alphanumeric characters except “’”, “/”, “&”
  - Whole string rough search
  - Parse components
  - Standardize street types and quadrants
  - Standardize street names
    - Search street name lookup
    - Search street alias lookup
    - Search similar street name
    - Spell check
  - Search the three street names
  - Match street type
  - Match quadrant
  - Calculate confidence level
  - Return records

Verify DC Block -- 3

- Accepts
  - One concatenated block string (contains “BETWEEN” and “&” or “AND”)
  - Three streets
  - Block name, i.e. 400 block of 4th st nw

- Returns
  - **Standardized block by cross streets**
  - **Block ID**
  - **Block name (range-street name-street type-quad)**
  - **Intersection ID 1**
  - **Intersection ID 2**
  - **Street ID 1**
  - **Street ID 2**
  - **Street ID 3…**
  - **Standardized on street**
  - **Standardized from street**
  - **Standardized to street**
  - **On/From/To street Name**
  - **On/From/To street Type**
  - **On/From/To street quadrant**
  - **Address Ranges**
    - **Actual Left (High & Low)**
    - **Actual Right (High & Low)**
    - **Theoretical Left (High & Low)**
    - **Theoretical Right (High & Low)**
  - **X, Y coordinates for block centroid**
  - **Confidence Level**
  - **Block bounding box x,y coordinates**

Verify AID -- 1

- The Verify AID operation find a DC address by AID. The MAR VW_ADDRESS view will be used for verification.

Verify AID -- 2

- General Process
  - Strip out all non-numeric characters
  - Search the AID
  - Return records

Verify AID -- 3

- **Accepts**
  - **Numeric AID**
- **Returns same as address service, plus:**
  - **Metadata ID**
  - **Type**
  - **Reason**
  - **Agency**
  - **Creation date**
  - **Created by**
  - **Change date**
  - **Changed by**
  - **Inactive date**
  - **Comments**
  - **Unit number (many)**
  - **Unit type (many)**
  - **Unit SSL (many)**

Verify SSL -- 1

- The Verify SSL operation find a DC address by SSL. The MAR VW_ADDRESS view will be used for verification.
- The SSL is the base SSL of the address, it is not the SSL for the unit.
- Square is required. It can be alpha (“RES” or “PAR”), numeric, but not empty.
- Suffix can be numeric, alpha, or empty.
- Lot can be numeric or empty.

Verify SSL -- 2

- General Process
  - Strip out all non-alphanumeric characters
  - Add leading zeros to numeric square, suffix, or lot until it reaches 4 digits in length
  - Search SSL
  - Return records

Verify SSL -- 3

- Accepts
  - Square, suffix and lot
- Returns same as address service (0, 1, or Many addresses)

Verify Place -- 1

- The Verify DC place operation find a DC address by place name. The MAR VW_ADDRESS & ADDRESSALIAS views will be used for verification.

Verify Place -- 2

- **General Process**
  - **Strip out special characters**
  - **Rough match the whole string**
  - **Parse the string into components using space**
  - **Search place name that matches all components**
  - **Search place name that matches any components**
  - **Spell check each non-numeric component**
  - **Search place name that matches all spell checked components**
  - **Search place name that matches any spell checked components**
  - **Get address information through the matched AID**
  - **Return records**

Verify Place -- 3

- **Accepts**
  - **Place name**
    - **Address Aliases**
    - **Other major buildings without standard addresses**

- **Returns Same as address service plus**
  - **Place Name**

Wrapper -- Find DC Location -- 1

- The Find DC Location operation can find any DC address, intersection, block, AID, or place name.

Wrapper -- Find DC Location -- 2

- **General Process**
  - **Strip out non-alphanumeric characters except “’”, “/”, “&”**
  - **AID test (all numeric)**
  - **Block test (“BLOCK”, “BLK”, “BETWEEN” and “AND” or “&”)**
  - **Intersection test (“&” and “AND”)**
  - **Address test (Contain number)**
  - **Place name search**
  - **Redirect to the proper operation**

Wrapper -- Find DC Location -- 3

- **Accepts**
  - **One string.**
- **Returns**
  - Name of service called plus
  - See description of that service

Wrapper -- Find Address/Intersection -- 1

- Find Addresses or Intersections only. Works inside or outside DC.

Wrapper -- Find Address/Intersection -- 2

- General Process
  - Find out if it is the address or intersection is inside DC by:
    - Zip code in DC?
    - City, state, zip are empty?
    - City, state is Washington, DC?
  - Outside DC uses TeleAtlas data and ArcIMS Route Server
  - Find out if it is an address or an intersection by:
    - Search for “&” or “AND”
  - Redirect to the proper operation

Wrapper -- Find Address/Intersection -- 3

- Accepts
  - Address string, city, state or zip code.
- Returns
  - **Name of service called**
  - **Depends on which operation get called**
  - **Outside DC Addresses or Intersections get:**
    - **Standardized full address or intersection**
    - **X,Y coordinates**
    - **ESRI score**

Address Submission App -- 1

- Follow link to testing page (or come directly)
- Allow user to test and submit a valid, but not verified address into the MAR UN-VERIFIEDADDRESSES table.
- An address is valid but not verified when the street name/street type/quad is valid, and the address number doesn’t exist, but falls in the range of this street.

Address Submission -- 2

- **General Process**
  - **User filled in the address in the testing page.**
  - **A detailed report tells the user what is wrong with the address.**
  - **User will be able to make change to the address.**
  - **When the address become valid, but not verified, a link to submission page appears.**
  - **User enter contact information into the submission page.**
  - **User click on the submit button on the submission page.**
  - **If the address exists in the UNVERIFIEDADDRESSES table, the record will be returned.**
  - **If not exist, the address will be stored and user will be issued a ticket number.**

Address Submission -- 3

- Address Tracking
  - User will be able to search an submitted address through ticket number.

DC GIS Metadata

- **FGDC Standard**
  - **Identification**
  - **Data Quality**
  - **Spatial Data Organization**
  - **Spatial Reference**
  - **Entity and Attribute**
  - **Distribution**
  - **Metadata Reference**
- **Minimum Requirement - <u>Encouraged to do more</u>**

DC GIS Metadata

Identification

- Originator
- Title
- Abstract
- Purpose
- Publication Date
- Currentness Reference
- Progress
- Update Frequency
- Supplemental Information
- Keywords (Place and Theme)
- Access Constraints
- Use Constraints
- Contact Information
- Data Set Credit

DC GIS Metadata

Data Quality

- Attribute Accuracy
- Logical Consistency
- Completeness
- Horizontal Positional Accuracy
- Vertical Positional Accuracy
- Process Step Information
- Source Information

DC GIS Metadata

Spatial Data Organization

- Spatial feature type
- Feature count
- ESRI automatically populates this section in ArcCatalog when creating or updating metadata.

DC GIS Metadata

Spatial Reference

- Spatial Reference or Projection of the Data Set
- Projection Name
- Horizontal Datum and Units
- ESRI automatically populates this section in ArcCatalog when creating or updating metadata if the spatial reference has been defined.

DC GIS Metadata

Entity and Attribute

- Attribution of the Data Set

- Each column in the data set needs a description clarifying the contents of the column.

- Users are encouraged to enter the value domain information for columns to help users translate the contents of the column where needed.

DC GIS Metadata

Distribution

- Distributor Contact Information
- Distribution Liability
- Ordering Instructions

DC GIS Metadata

Metadata Reference

- Metadata Date
- Metadata Contact Information
- Metadata Review Date

DC GIS Metadata

- **DC GIS will offer templates on intranet site**
- **Several templates offered for flexibility**
- **Profile added to Federated Model Document**