COORDINATING GIS SCHEMA

WORKING WITH MULTIPLE JURISDICTIONS

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DCMP FACTS
(Dulles Corridor Metrorail Project)

Seamless integration with current 106-mile Metro system.

23-mile extension
- Branches off existing Orange Line after East Falls Church Station.
- Provides direct connections to DC.

11 new stations
- 5 in Phase 1
- 6 in Phase 2
DCMP FACTS

• Sponsored by the Metropolitan Washington Airports Authority.

(Airports Authority)

• Transferred to, operated and maintained by Washington Metropolitan Area Transit Association (WMATA).
Phase 1

- East Falls Church to Wiehle Avenue.
  - Opened in July 2014.

Phase 2

- Wiehle Avenue through Dulles Airport to Ashburn.
  - To be completed by 2019-2020.
DCMP Route Map

LEGEND
- Existing Orange Line Track and Station
- Surface Track
- Transfer Station
- Elevated Track
- Underground Track
- New Station
- Partially Below Surface Station

Dulles Corridor Metrorail Project

Dulles Airport
Loudoun Gateway
Ashburn
Innovation Center
Herndon
Reston Town Center
Wiehle-Reston East

Tysons Corner

Spring Hill
Greensboro
McLean

Vienna/Fairfax-GMU
Dunn Loring
West Falls Church
Ballston-MU
Virginia Sq-GMU
Clarendon Court House
Rosslyn

0 1 2 3 MILES

Dulles International Airport Access Highway/Dulles Toll Road
Virginia
Washington DC
Maryland
Provide bypass relief to DC Metropolitan area congestion

- District of Columbia, AKA “The Nation’s Capital”
- Tysons Corner
  - Dining, shopping, and entertainment venues
  - Housing and employment centers
- Dulles International Airport
Legend

- Boulevard
- Avenue/Collector
- Local or Service Streets (not yet defined)

Note: This map is generated from Map 7 in the Transportation section of the Comprehensive Plan. It is intended to map the Urban Design Streetscape Types in Tysons. For functional classifications, refer to Map 7 of the Comprehensive Plan.
Fairfax County

- **Tysons Corner**
  - 122,455 jobs
  - 26.4 million sq. ft. of commercial space

- **Reston**
  - 63,938 jobs
  - 19.8 million sq. ft. of office space

- **Herndon**
  - 18,267 jobs.
  - 6 million sq. ft. of office space
**Loudoun County**

- One of the fastest growing counties in the country.
  - 134,645 Jobs
  - 8,987 Businesses

- More than 175 organizations employ more than 100 or more people.

- Dulles International Airport employs more than 18,000 people, serves 21.9 million passengers a year and generates $4.9 billion in revenue for the regional economy.
Design-Build Contractor: Dulles Transit Partners (DTP)

- 11.7 mile from Falls Church to Wiehle Avenue

- 5 stations:
  - McLean
  - Tysons Corner
  - Greensboro
  - Spring Hill
  - Wiehle - Reston East

- Modifications to West Falls Church Rail Yard & Maintenance Facility

- Garage at Wiehle Avenue – Fairfax County
PHASE 1

- Opened July 26, 2014
- Stations average more than 14,000 riders daily
- Over half of riders use Wiehle-Reston East station
- Surpassing projected ridership
PHASE 2
Metro Rail

D-B Contractor

- Capital Rail Constructors (CRC)

11.6 mile extension from Wiehle Avenue to Ashburn.

6 stations

- Reston Town Center
- Herndon-Monroe
- Innovation Center
- Dulles
- Loudoun Gateway
- Ashburn Village
PHASE 2
Dulles Rail Yard & Maintenance Facility

- D-B Contractor
  - Hensel Phelps (HP)

- Located on Dulles Airport property.

- Accessed via separate “yard lead” tracks.

- Service and Inspection.

- Maintenance of Way.

- Warehouse
  - Transit police
  - Storage of the new 7000-series fleet
**PHASE 2**

**Garages**

- Managed and built by Fairfax and Loudoun Counties.
- Serving commuter and local needs.

**4 stations**

- Herndon-Monroe
- Innovation Center
- Loudoun Gateway
- Ashburn
Origins of GIS on Phase 2 of the Project
In 2011, prior to the completion of Phase 1, WMATA and the Airports Authority were each developing GIS libraries to serve as a tool for all future planning and other projects.

Discussion held to find out most pertinent features to include as well as an appropriate deliverables timeline.
CUSTOMIZING THE GIS
Phase 2

Purpose
- Provide GIS files specific to the Airports Authority and WMATA for review and acceptance.

Requirements
- Final Design Submittals.
- As-built GIS Submittals.
GIS Process

Submittal Timeline.

• 90 days after Issue (for Construction).
  – This assumes most of the details at the CAD level are mostly worked out and are what will be constructed.

• After submitting As-Built Drawings.
  – This is the final drawing turned in for the project. It ensures that any changes during construction get captured in the GIS data as well.
Process and Schedule

- Receive 60% Package Design
- Contractor revises Design
- Receive 90% Package Design
- Contractor revises Design
- Receive 100% Package Design
- Contractor revises Design
- Package Issued for Permit
- Permit Approval
- GIS Package Developed
- As-Designed GIS Received
- Construction Begins
- Construction Ends
- As-Built GIS Package Received

GIS from As-Designed modified for As-Built (if changes in Construction)
SOLVING CHALLENGES
The Airports Authority & WMATA

Facing Challenges

- Coordination of multiple jurisdictions.
  - Airports Authority
  - WMATA
  - Fairfax County
  - Loudoun Co.

- Create group coordination sessions at major milestones to update jurisdictions on status of deliverables and input on any new features.
CHALLENGES

Design Build Deliverables were fragmented for ease of construction, not optimized for project-wide visualizations needed from GIS.

Stations
Track
Road Improvements
CHALLENGES

- Data Dictionaries were developed for specific needs
- Modify existing classes to satisfy each jurisdiction’s needs.
Challenges

- Attribution of Labels and CAD Detail sheets.
  - The process of taking CAD labels and turning them into meaningful data in Attributes table.

- Contextualizing CAD layers for conversion into meaningful features classes in GIS product.
  - The process of determining how to fit CAD layers into GIS features.
CHALLENGES

- CAD details at the design stage do not translate well into GIS shape files.
- Details from CAD level had to be modified for appearance in GIS.
Challenges

Both WMATA and the Airports Authority require different projection systems.

Design - Build Contractor submits deliverable, one projected in each coordinate system, for review.

- WMATA uses Low Distortion Projection
  - Recently transitioned from WMATA Project Grid
- MWAA uses Virginia State Plane North
The features created in the As-Designed phase are subject to change.

Final Delivery stage: The As-Built design captures any changes that happen with construction.
DATA
DATA EXAMPLE: TREE RELOCATION
DATA EXAMPLE: TREE RELOCATION

From DP101 Landscaping Plan

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Attributes using Airports Authority GIS Data Dictionary for Required Fields
DATA
Report and Issues Resolution Tracking

Environmental Due-Diligence Report Tracking

Environmental Issues Resolution Tracking
DATA
Inspection Tracking and ROW Acquisition

Environmental Inspection Tracking

ROW Parcel Negotiations
Pier Locations

Pier Locations from Autopilot Drive to the Dulles Yard.
Emergency Responders

Area Fire Station Travel Times - Destination: Herndon-Monroe Station South Pavilion

Legend
- Firestation Locations
- Rail Stations
- Silver Metro Line

Legend:
- Firestation Locations
- Rail Stations
- Silver Metro Line

Emergency Responder Locations

Sources: Esri, HERE, DeLorme, TomTom, Intermap, iXTOCA, GEBCO, USGS, FAO, NPS, NRCS, JIRI, GIO, Kadaster NL, Ordnance Survey, ESRI Japan, METI, Earl S. Cline (Hong Kong), Spirent, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community.
OPPORTUNITIES
- Review every rail and yard GIS submittal.
- Make requested changes prior to official submission.
As WMATA develops its data dictionary, the As-builts can incorporate the changes to maintain usability.

As Airports authority defines their GIS needs, the data library can introduce new feature classes to the airport campus GIS.

GIS developed to serve both clients needs.

- WMATA’s infrastructure.
- Airports Authority’s property.
FUTURE FOR GIS
SILVER LINE
GIS & THE SILVER LINE PROJECT

What’s in the Future

- Review As-Designed submittals.
- Coordinate with the Airports Authority and WMATA with comments and revisions/updates to the GIS Data Dictionaries.
GIS & the Silver Line Project
End Game

Provide highly accurate GIS submittals conversions.

- Able to be successfully incorporated and utilized within both systems.

Operate with real-time data.

- Network operations.
- Maintenance schedules.
- Service life records.
QUESTIONS?

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Questions
Answers

Dulles Corridor Metrorail Project
Metropolitan Washington Airports Authority