

CONTENTS

4 EXECUTIVE SUMMARY

6 INTRODUCTION

10 NORTHERN VIRGINIA

22 LOUDOUN COUNTY PLANNING DOCUMENTS

56 CENSUS DATA MAPPING

66 PROJECTIONS

68 LOUDOUN COUNTY DATA CENTERS



EXECUTIVE SUMMARY

Data Center and Loudoun County Case Study

This research project begins to investigate the development of data centers in the Northern Virginia area with a particular emphasis on Loudoun County, Virginia. The following report introduces Virginia data centers, the formation of Northern Virginia I-95 "digital highway" and "data center alley", Loudoun County urban planning documents, census data mapping, projections relating to techno-economy, and the development of data centers in Loudoun County. This report contains linked articles, reports, planning documents, maps, and charts.

Northern Virginia has become a major hub of data center development in North America along the "I-95 digital highway" and the "data center alley". Its history of telecommunication, transportation, population growth, and economic incentives have encouraged technological infrastructure and construction of data centers. Fiber connectivity, competitive cloud environment, strategic location, relatively few natural disasters, affordable and reliable power cost, and business climate are possible reasons for the central development of data centers in Northern Virginia. The real estate market demonstrates increased interest and expansion of hyper scale data centers platforms into the Ashburn and Prince William County areas. As of 2015, Amazon had 38 data centers in Virginia and has continued to expand construction around Dulles International Airport in Loudoun County. Development is

projected to continue with the 2020 Northern Virginia Amazon Headquarters project.

Loudoun County Virginia represents one of the largest concentrations of data centers in the United States with more than 70% of global internet traffic passing through county digital infrastructure. Comprehensive plan and transportation studies outline important factors of economic development which include Dulles International Airport, fiber networks and current Metro-rail expansion to the Washington, D.C. area. Suburban Policy, Urban Policy, and Priority Commercial Redevelopment Area maps outline land use that correlates to Loudoun County "data center alley" growth. Loudoun County Strategic plans include 1) land use plans for telecommunication facilities, 2) Historic preservation plans and 3) Route 50 Corridor Design Guide. The Route 50 Corridor Design guide demonstrates the importance of the area as a gateway to Loudoun County and establishes design goals for the Dulles International Airport Area, including patterns for main street, plaza, and commercial district design.

The census data mapping derived from GISOnline open data and raw data from the 2018 ACS 5 Year report at the Block Group level that were transformed into GIS shapefiles layers depicting:

- Boundaries
- Small area plans
- Metro-rail station service districts
- Historic districts
- Loudoun village conservation

- Demographics
- Total population
- Race

- Median Home Value
- Housing Occupancy
- Per capita Income
- Percent with Cash /Food Stamps/ SNAP

East Loudoun County is bordered by Montgomery county to the North, Fairfax County to the East, and Prince William County to the South. East Loudoun County has a high concentration of data centers around Dulles International Airport with a higher consolidation to the North East. Based on 2018 Block Group data, it appears that blocks in East Loudoun County had higher population density, lower percent of white residents, significantly higher percent of Asian residents, and low rates of housing vacancy in comparison to central Loudoun County. Across Loudoun County, there is greater variation in percent of black residents by block group in comparison to percent of White or Asian Race groups. Median home value is slightly lower in East Loudoun and higher median home value around the center of the county. Per Capita income follows similar trends as median home value. The majority of block groups have an average per capita income around \$49,000 to \$91,000.

Loudoun County projections section outlines economic growth factors, tax revenue, and population growth. The Loudoun County Comprehensive plan highlights economic growth beginning in 1962 with the development of Dulles International Airport, followed by Fiber Network data center industry resurgence in 1996, and current Metro-rail expansion to connect Loudoun to Washington Metro Area. According to a NVTC Report, the development of data centers are significant contributors to economic growth in Virginia. In 2018 Loudoun county collected \$195 million in taxes



on business computer equipment alone and projections are expected to increase.

Virginia is one of the largest data center markets in North America and Ashburn, Virginia represents a prominent location in the data center market for major tech and data driven companies. Ashburn saw a resurgence of investment in 2006 through the telecommunications industry and data center expansion, which steadily increased around the Dulles Airport Corridor.

The relationship of urban and suburban design and data center development have shifted since the 1990s. In the 1990s, telecommunications and data center facilities design were more ambiguous and anonymous. However, there is now greater emphasis on designing data centers with attractive facades and landscaping.

In summary, Virginia represents a substantial site of growth for telecommunication and data center development in North America with a particular concentration in the Northern

AREAS FOR CONTINUED STUDY

- Northern Virginia – 1) Importance of Virginia Beach as Sub Sea Cable opportunity and extension of I-95 Digital Highway 2) What is the relationship between the development of "data center alley" and the "I-95 Digital Highway"
- Loudoun County – 1) How have Area Management 1 and 5 Plans for Eastern Loudoun (Adopted 1980) and Dulles North (Adopted 1985) changed with the development of "data center alley".
- Census data – 1) mapping additional years of census data to determine the rates of change over time could be used to better understand demographic, economic and real estate projections for areas with consolidated data center development. Focus on mapping census data that correlate to tax revenue economic development, and population from the Projections section.
- Projections – 1) Virginia and Loudoun County Tax revenue and tax incentives related to technology industry