



Market Analysis and Best Practices Study Final Report

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**Prepared by:
HR&A Advisors and Kimley-Horn**



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EXECUTIVE SUMMARY

I. INTRODUCTION

In the context of changing real estate market and economic conditions and in response to a range of recommendations from an Urban Land Institute Technical Assistance Panel in May 2014, Loudoun County retained HR&A Advisors and Kimley-Horn (“the HR&A Team”) to conduct a market analysis and best practices study to guide the land use recommendations around Loudoun County’s Future Metrorail Station Areas. HR&A is a real estate, economic development, and public policy consulting firm. Kimley-Horn is a transportation and land-use planning firm, with expertise in airport development and operations.

The opening of the Loudoun Gateway and Ashburn Silver Line Metrorail Stations in Loudoun County will provide a new opportunity to bring higher density, transit-oriented development to the County. However, since the creation of the land use plan policies around the Station Areas, the regional economy has evolved with changing needs from office and other types of users. This market analysis and best practices study focuses in particular on the areas within one-half mile of the two Station Areas, and based on this analysis provides recommendations with respect to the County’s four goals for these Station Areas and the larger Metrorail Service District, which are:

1. Prompt realization of tax revenues to support future Metrorail operations;
2. Maximizing future employment generation;
3. Achieving the desired land use pattern; and
4. Minimizing demands on the County’s transportation infrastructure.

The HR&A Team used the following approach in conducting this study:

Section 1: Existing Conditions. The HR&A Team established a baseline of information through an extensive review of County policies, planning documents, and previous studies; an assessment of usage trends at Dulles Airport; a site tour; and interviews with a range of key stakeholders, including county staff and area land owners. The purpose of this existing conditions assessment provided in Section 1 of the report is to describe the current plan policy and land use context. The HR&A Team structured the findings of this Section to include:

- a. A discussion of the current Station Area Development and Land Use patterns (page 1-2);
- b. An overview of the current Economic Conditions in Loudoun County (page 1-7);
- c. An overview of the Trends and Forecasts for Dulles and Regional Airports (page 1-10); and
- d. Implications for the Market Assessment (page 1-11).

Section 2: Regional Real Estate Market Analysis. The HR&A Team conducted an analysis of market conditions in Loudoun County to assess demand for development at the Station Areas. The purpose of this analysis is to provide an outlook for non-residential development, with additional context on trends in airport-adjacent development and potential catalytic anchor uses that might be suitable to promote non-residential station area development or to provide alternative forms of development if the office market does not materialize. This section includes:

- a. An assessment of Regional and Local Demographic and Economic Factors in Loudoun County compared to the region (page 2-3);
- b. An assessment of the Real Estate Market Conditions for office, retail, industrial, hospitality, and residential uses (page 2-11);
- c. An analysis of the Competitive Positioning of the Station Areas with other station-area development in the region (page 2-27);
- d. An overview of Airport-Adjacent Development Trends at select airports around the world (page 2-36);
- e. An assessment of Potential Catalytic Anchor Uses for the Station Areas (page 2-44); and
- f. Conclusions on the Outlook for Non-Residential Development (page 2-64).

The HR&A Team's research of real estate market data and precedents was supplemented by interviews with 18 stakeholders, including county staff, local property owners, and business leaders. A list of stakeholders interviewed and key takeaways from the interviews can be found in Attachment 4 of the Appendix.

Section 3: Key Trends in Airport-Adjacent Development. Building on the scan of the airport adjacent development in Section 2, the HR&A Team conducted an in-depth analysis of land use and development patterns around six airport areas that were selected based on evaluation of metrics, including exurban location and proximity to transit, and in conjunction with the project steering committee. Key findings in Section 3 are structured by:

- a. A discussion of Land Use Planning Around Airports focused on land-use and development compatibility, including challenges related to on-the-ground safety concerns and aircraft noise impacts (page 3-3);
- b. Detailed Case Studies of Compatible Airport Adjacency (page 3-8); and
- c. A review of the Team's Conclusions relating to airport-adjacent land use for the Station Areas and Loudoun Gateway Station in particular (page 3-53).

Section 4: Recommendations for Station Area Development. Based on the extensive analysis in this study, the HR&A Team makes five Key Recommendations regarding land use policies to guide future development decisions around the forthcoming stations and provides an assessment of implications on employment and tax revenues. The HR&A Team's recommendations also touch upon current zoning and Plan Policy implications at the Station Areas as they relate to the HR&A Team's recommendations.

II. SUMMARY OF KEY FINDINGS

The following sections provide summaries of the key findings from each section of the report.

A. EXISTING CONDITIONS AND CURRENT LAND-USE POLICIES

Station Area development is a significant County priority. Loudoun County's Revised General Plan as amended through 2013 designated the areas around the future Loudoun Gateway and Ashburn Stations as distinct Transit Nodes within its Suburban Policy Area. Loudoun Gateway is planned to be a Transit-Related Employment Center (TREC) and is also included in the County's Airport Impact Overlay due to its proximity to Dulles Airport flight paths. The Ashburn Station will incorporate Transit-Oriented Development (TOD) under the County's TOD policies and Transit Related Center (PD-TRC) zoning. The key difference between the two Station Areas' planned land uses is the inclusion or exclusion of residential uses, which is prohibited at Loudoun Gateway due to potential conflicts with flight operations at Dulles Airport.

Development around the planned Ashburn Station has not yet realized its full potential in transit-oriented development. The Ashburn Station Area has undergone detailed County-led planning and was rezoned as Planned Development-Transit Related Center (PD-TRC) to facilitate TOD development. Plans for the Station Area were further refined in 2001 with the County's adoption of the Revised General Plan. Due to market conditions, only the residential components of projects that were originally approved as "mixed-use" have been completed and land dedicated to office remains vacant, creating an incomplete development pattern. Land-use policy around the Ashburn Station allows developers to build residential at higher densities once Metrorail opens, and the Team found that some residential developers with approvals already in place are waiting to build until the Ashburn Station has opened so that they can realize the value of their property at these higher densities.

Land surrounding the planned Loudoun Gateway Station is largely undeveloped or used for commuter parking. Located north of Dulles Airport, the Station's proximity to the Dulles Greenway, Route 606, and Route 634 has facilitated the development of a commuter parking lot, Dulles North Transit Center, with 750 spaces. This lot is consistent with the County's long term vision to have the Loudoun Gateway Station serve as a transit hub. Several bus carriers, including the Virginia Regional Transit and Loudoun County Transit, use the lot and provide service for commuters to key employment centers in Washington, DC, Fairfax County and Arlington County. With the opening of the station, there are plans to expand the commuter parking facilities to a total of approximately 2,750 spaces.

Land within a half-mile of the planned station is controlled by a small number of property owners, including nearly a third by the Metropolitan Washington Airports Authority (MWAA). Some light industrial uses are located in areas north of the Station, but a majority of the land remains unimproved and no development plans have been formally submitted to the County. Land use around the planned station is governed by two land use policies. The first is the PD-TREC zoning, which only allows commercial development within the area a half-mile from the planned station. The area around the Station is also part of the Airport Impact Overlay District, which includes noise contours of 60 – 65 LDN and prohibits

residential development in areas of 65 LDN or higher.¹ Given the Station's proximity to the Airport, the purpose of the zoned Overlay District is to encourage commercial development that could be affiliated with the Airport and protect Airport operations from potential conflict with residential development.

Dulles Airport is a major asset to the Loudoun County economy. Serving nearly 22 million passengers in 2013, it is a major hub for domestic travel and is the largest international airport in the Washington Metropolitan area by an order of magnitude. An economic impact study conducted by MWAA showed that the airport supports over 18,000 jobs in Loudoun County alone and \$1.2 billion in state and local tax revenues.

B. ECONOMIC AND REAL ESTATE MARKET CONDITIONS

The HR&A Team analyzed economic and real estate market conditions to identify future trends that could impact development at the Station Areas. Loudoun County has a number of assets that provide a strong macroeconomic foundation for future growth. These include:

- **A growing, highly educated population.** The estimated 2015 population of 367,096 residents was 116% higher than the population in 2000, and forecasts call for an additional 33% increase by 2040. Of these residents, 58% have at least a bachelor's degree, compared to 48% in the overall Washington Metro Region. The County is also one of the wealthiest in the United States with a median household income of \$122,238.
- **A strong employment base.** The 175,439 jobs in 2014 was an 84% increase over the number of jobs in 2000. Like the rest of the Washington Metro Region, the County is heavily dependent on the Federal government as a core economic driver and employment growth has slowed as a result of cuts in Federal spending. However, compared to other counties in the region, Loudoun's economy is relatively diverse with strong employment growth in the tech sector.
- **Global air access.** Dulles Airport is the largest international airport in the region with extensive global and domestic connections. Proximity to the airport is attractive to companies and people that do business in the global market place and require regular travel.
- **Technology infrastructure.** Locations in the County offer direct access to MAE-East, redundant fiber-optic networks, and affordable power, making it desirable to technology companies in particular.
- **Quality of life.** The County is recognized for its outstanding school system, recreational amenities, access to the outdoors, and relative affordability compared to the inner ring suburbs.

The expansion of the Silver Line will build on these already considerable assets by providing a new rail link between Loudoun and employment centers in Tysons Corner, Arlington, and ultimately Washington, DC.

¹ The Loudoun County Airport Impact (AI) Overlay District zoning ordinance uses the acronym LDN to refer to noise level categories. According to the Revised 1993 Zoning Ordinance, AI-Airport Impact Overlay District § 4-1406 (A) (2015), Ldn: The symbol for "yearly day-night average sound level", which means the 365-day average, in decibels, for the period from midnight to midnight, obtained after the addition of ten decibels to sound levels for the periods between 10 p.m. and 7 a.m., local time. The Federal Aviation Administration uses the acronym DNL (Day-Night Average Sound Level) to refer to the same noise categories. This report uses LDN when referring to the Loudoun County AI Overlay District zoning ordinance and DNL when referring to FAA rules.

The opening of three² rail stations within Loudoun County creates a limited amount of land with the potential for transit-oriented development that, in other parts of the region, is consistently generating higher returns than property development that is not transit accessible. The implications for development by product type are as follows:

- **Office development in the near term will likely be challenging, but prospects for office development at the Station Areas will improve as areas around other Silver Line Stations get built out.** Recent office leasing activity in the metropolitan region has favored transit-accessible locations, 92.3% of overall regional office leasing volume in 2014 occurred in office buildings within one-half mile of planned or existing Metrorail stations. As the regional office market improves, locations situated close to Metrorail will be better positioned than locations that are not transit-accessible. Developers and tenants are hesitant to commit before there is confidence around the Silver Line opening date.
- **Retail development is strongly influenced by location attributes and generally follows residential and office growth.** Continued population growth and high incomes have fueled a steady retail market in Northern Virginia with a low vacancy rate of 5.6% in Q1 2014. This has supported new retail growth in the County, mainly-oriented around “town center” mixed use style developments, such as One Loudoun.
- **The residential market in Loudoun County is consistently strong due to the County’s high quality of life and higher-quality housing stock.** The market was historically dominated by single family detached homes but product types are beginning to diversify with more apartments and townhouses developed as part of “town center” style projects.
- **The hospitality industry is primarily oriented towards business travel and benefits from the presence of Dulles Airport.** Regional forecasts show positive growth in both business and leisure travel.

The HR&A Team also assessed real estate market conditions and development patterns at comparative regional rail stations to identify trends that could be informative for development around the Loudoun Gateway and Ashburn Stations. The set of stations were selected to include a mix of suburban and exurban locations. The following key findings are based on this analysis and built on the assessment of demographic, economic, and real estate market conditions:

- **Large scale transit-oriented development takes many years and will likely happen over several economic cycles.** The Rosslyn-Ballston corridor stations opened 35 years ago and the build out of the corridor has taken place gradually over this entire period. While Tysons was developed prior to the Metrorail extensions, other new and planned stations have only seen an uptick in development immediately before, or in years following the Metrorail station opening.
- **Station areas may benefit from large anchors, but usually have a mix of uses.** Most of the stations had an educational, recreational, or cultural anchor. However, none of the stations analyzed were dominated by one type of land use.
- **Commuter-oriented parking and transit-oriented development are often conflicting land-uses.** Large surface parking lots adjacent to transit stations often create a barrier to walkability and reduce the amount of station-area land that can attract walkable, transit-oriented development. In general stations with larger parking lots have experienced less development; but as land around

² This report focuses on the Loudoun Gateway and Ashburn Stations. The Dulles Airport Station is on MWAA property, but development around the station would generate tax revenues to the County.

Metrorail stations increases in value, some stations such as White Flint have seen redevelopment plans to replace surface lots with structured parking and new development.

- **Terminal station development is more challenging.** Terminal stations typically have more parking to serve a larger commuter catchment area. Users must weigh the higher costs typically associated with transit-oriented locations with the fact that transit only serves one direction and a significant percentage of customers or employees will still arrive by car.
- **Loudoun's Station Areas benefit from control of majority of land by few owners.** Consolidated control provides an opportunity for phased, coordinated large scale development and curated tenant bases. This could accelerate the pace of development compared to stations with multiple owners and projects requiring parcel assembly.
- **Local governments have taken an active role in setting a vision for station development and sticking to it.** Many station area plans were the result of government initiative planning processes and development of community visions.

Potential Catalytic Anchor Uses

As part of the market analysis, the HR&A Team assessed the potential for catalytic anchor uses at the Loudoun Gateway Station, which could establish the station as a destination and potentially spur ancillary development. Specifically, we assessed the following uses:

- **Convention Center and Hotel:** The Team estimates that a convention center, hotel and some surface parking of approximately 500,000 SF could fit within the available land at the Loudoun Gateway Station. Demand for this type of space is likely to continue with regional employment growth. However, convention centers generally require significant public investment and must be developed as part of a dynamic mixed use development to provide compelling entertainment and recreation options for visitors when they are not in meetings.
- **Destination Retail, Entertainment, and Hotel:** The success of airport-retail precedents along with strong income and population growth in Loudoun County suggest that there would be a market for this use proximate to transit. The hybrid model of retail and entertainment uses, such as Mall of America, provides an example that is differentiated from the existing local resident-oriented retail base by attracting visitation from tourists and the wider region.
- **Research Center:** Investment is typically made by a university or government entity. A Loudoun County location could be attractive to institutions with expansion plans in the region.
- **Tech Incubator:** Incubators are often developed with institutional partners and would need to be part of an amenitized mixed use development. This use could play to the County's strength in this section and potentially be supported by existing established institutions.
- **Sports and Recreation Facility:** Given the population growth, there is demand for additional sports and recreation facilities to serve local and regional residents, and that supplement the facilities operated by Loudoun County. To capture demand at the station areas, a sports facility would have to provide facilities not offered in the region, and aspire to a semi-professional complex that could capture regional and professional sports uses.
- **Professional Sports Stadium:** Could be accommodated from a physical perspective, but would probably require structured parking (that could potentially be shared with commuter parking). A challenge is that a stadium takes a large amount of land area, but is inactive the majority of the time. Ultimately this use is highly dependent on a single tenant (e.g. the Redskins) and a

combination of business and political decisions for which the County is one of many interested parties.

Outlook for Non-Residential Development

The Team developed the following outlook for non-residential development based on the analysis of regional economic and market trends.

- The market for new office development is challenged in 2015 with excess supply of vacant office space in the County and the Northern Virginia market. However, Loudoun County's fundamentals are strong for longer term office growth and in particular once Phase 2 of the Silver Line opens as expected in 2020.
- Once the Silver Line opens, Loudoun County and the Station Areas in particular will be more competitive in attracting regional and national office tenants seeking transit-accessible office space.
- The HR&A Team estimated that 9 million SF of office space could be absorbed at the Station Areas over the next 25 years based on regional office market absorption and employment growth figures, combined with an assessment of absorption at other Metrorail stations.
- Given current office market conditions, developers and the County should consider interim uses to occupy sites as the market ripens. Interim uses can range in scale and tenure from one-off "pop up" uses (e.g., festival, beer garden, major outdoor event space) to longer term uses with an eventual plan for redevelopment (e.g., surface commuter parking or big box retail with a limited term pad lease).
- The Station Areas will also be attractive to retail and hospitality uses given the proximity to Metrorail and growth in regional employment.

C. AIRPORT-ADJACENT DEVELOPMENT TRENDS AND BEST PRACTICES IN LAND USE

The Team reviewed global airport adjacent development patterns to identify trends and uses that could be replicated in particular at the Loudoun Gateway Station to leverage its proximity to Dulles Airport. This review included high-level research and analysis of 14 international airports, seven in the United States and seven outside of the United States.

- Nearly all of the airports studied have some form of industrial, office, hotel, and commercial development uses for nearby lands that are either airport owned or privately held.
 - These non-aviation land-uses often draw on the airport as a catalyst for demand and as a means to attract business associated with aviation-related activities.
 - These areas primarily benefit airport passengers, airport employees, and directly adjacent communities, versus being regional destinations. Development on airport property increases revenues to the airport authority. Development on privately-owned property is taking advantage of the economic opportunity generated by the airport.
- Residential uses are often found in the proximity of urban airports near city centers: Haneda Tokyo and Washington Reagan National, and at older exurban airports, such as Frankfurt, Charles De Gaulle in Paris, Schiphol in Amsterdam, and Heathrow in London. Newer and better planned airports such as Kuala Lumpur, Denver and Singapore have actively sought to restrict residential uses nearby. The experience of these residential uses varies.

- All airports with residential uses in the flight path have had to implement noise mitigation programs, purchase noise impacted properties, and/or limit nighttime operations.
- The high-density residential developments and limited industrial and commercial developments at the older airports do not appear to have a clear plan to take advantage of the airport. Most of the land uses around these airports appear to have been planned considering the airport as an element/appendix of the region and not the center of its economic development.
- Even though several of these airports in recent years have embraced the idea of jointly working with their surrounding communities for an integrated land development plan for mutual benefit, past mistakes around the older airports are hindering the best use of lands. Due to poorly integrated developments, noise complaints are a common occurrence and neighboring residential areas have vocally opposed any major runway developments.
- While the majority of airports had some form of nearby retail development, Mall of America in Minneapolis is the most significant off-site retail anchor with its combination of retail and entertainment uses. Other airports, including Singapore and Kuala Lumpur, have significant retail on-site. The Mall of America example demonstrates that it is possible for private-sector, off-site development to influence and airport area's brand and establishment as a destination.

Based on this initial analysis and assessment of relevance to Dulles Airport, the Team's airport best practice analysis was further narrowed to six airport-area case studies: Dallas/Fort Worth, Denver, Minneapolis-Saint Paul, Frankfurt, Singapore, and Kuala Lumpur. The goals of this analysis were to identify examples of compatible and incompatible land uses in airport-adjacent areas, and to examine how airport rail access influences land use patterns. From the extensive analysis, three major overarching themes emerged that are important as we considered the implications for Loudoun County and developed a set of specific land use and policy recommendations.

- ***There is not a single "best practice" for compatible land uses around airports.*** Land use development patterns are extremely varied and driven primarily by the unique characteristics of the regional economy served by each airport. The presence of rail transit can help speed the pace of development, but in many cases the development would have occurred independent of rail access. The most common types of compatible uses are business-oriented with high levels of hospitality, office, retail, and logistics centers. The scan did find diversity in niche market uses – conference centers, high end outlets, and even pet hotels. What this means is that Loudoun County should adopt airport-adjacent land uses that are aligned with its regional economic strengths, market potential and land use policy goals.
- ***Airports have nearly uniformly restricted or prevented residential development in the flight path.*** Residential development often creates conflicts between local governments that benefit from the new development and airport operators that must invest in mitigation efforts. Better planned airports such as Denver, Dallas-Fort Worth, and Frankfurt actively seek to prohibit new residential development in the 60 Day-Night Average Sound Level (DNL) contours through a combination of coordinated land-use policies and more extensive airport land ownership. All airports examined by our team that had nearby residential development have had to invest significantly in noise mitigation efforts, either involving changes to airport operations, acquisition of residential properties, modifications to residential structures to reduce noise, or both.

- **Successful implementation of plans for airport-compatible development requires alignment between airport owners, local land use authorities, and major stakeholders.** While most communities examined by our team are in the early stages of adopting the Airport City/Aerotropolis model into local zoning codes, stakeholders are still working to understand what the concept means in practice. As a result, in the scan of comparable airports there were more examples of development in the planning phases than fully built out. The main exceptions that are further along in development are in Singapore and Kuala Lumpur, where there is common state-driven ownership of airports, airlines, and sponsorship of adjacent development. However, there is a clear trend towards a regional approach to airport development in which stakeholders collaborate to maximize joint goals and mitigate conflicts.

III. RECOMMENDATIONS AND POLICY IMPLICATIONS

The HR&A Team's recommendations are made in the context that in the foreseeable future, Loudoun County will have only three Metrorail Stations located within its borders on which commercial development could occur, and the County controls the land-use patterns at two of these stations – Loudoun Gateway and Ashburn. Other counties in the region have significantly more station areas, but for Loudoun County these Station Areas with Metrorail access are a scarce resource with which it can attract desired compact and walkable development that can create jobs, generate revenue, and become a vibrant destination for workers, residents and visitors. These recommendations are summarized below, and discussed in more detail in Section 4 of this report – including specific recommended changes to Plan Policy where appropriate and a high-level assessment of impacts on jobs and tax revenues.

KEY RECOMMENDATION #1:

Encourage the Transit Related Employment Center (TREC) policies in the Revised General Plan and maintain the Planned Development Transit-Related Employment Center (PD-TREC) zoning district for potential uses around the Loudoun Gateway Station to promote job-generating, airport-compatible uses.

Loudoun County implemented the (TREC) policy around the Loudoun Gateway (606) station as part of its Revised General Plan in 2001 to encourage a mix of compact, employment-based densities that would support transit, generate jobs and be compatible with the airport environment.

The HR&A Team recommends the County maintain the TREC land use policy around the Loudoun Gateway Station to support the longer term opportunity for commercial development that creates jobs, leverages the connection to Metrorail, and is compatible with Dulles Airport.

The HR&A Team's analysis produced four key findings which support this recommendation:

- The market analysis found that transit-accessible locations create rent premiums which translate into higher property tax revenues;
- PD-TREC prohibition of residential development avoids conflict with Dulles' airport-operations. Such conflicts at other airports have required mitigation with costs to airport operators, government entities, and property owners. Conflicts have also led to limitations of economic activity at airports;
- Global airport trends towards an "Airport City" model indicate that the Loudoun Gateway Station is well positioned to attract development that is affiliated with the airport and generate regional benefit; and

- The team recommends preserving the TREC policy now to help position the County to attract higher value, compatible, job generating uses in the future which may require several real estate cycles to achieve.

KEY RECOMMENDATION #2:

Start to consider a partnership between a private developer and a public entity (County, State, and/or MWAA) to pursue a catalytic anchor, if applications for commercial development consistent with TREC Plan Policy have not started to materialize within two years after the Metrorail opening date at Loudoun Gateway.

The HR&A Team recommends the County consider zoning flexibility that could encourage the development of a catalytic anchor use at the Loudoun Gateway Station to catalyze development and create a brand for the station, further increasing the overall economic activity in the Station Area. The HR&A Team's study analyzed six potential anchor uses, including a convention center with hotel, destination retail, entertainment and hotel, research center, tech incubator, sports and recreation facility, and a professional sports stadium.

The HR&A Team's analysis produced several findings which support this recommendation:

- The Team found that due to Loudoun Gateway's consolidated land ownership, there is a unique opportunity for a large-scale catalytic anchor development;
- Developing and promoting a unified station brand for Loudoun Gateway will help differentiate it from other stations and help developers attract and retain tenants; and
- Strong growth and high incomes in Loudoun County could support new commercial development at the Station, and complement current retail and entertainment development in Loudoun County.

Based on the Team's assessment of catalytic anchor uses at other locations, it is probable that such a use in Loudoun County would require public investment, such as subsidies, tax abatements or grants, from the County, State, and/or MWAA. The Team recommends that any proposed anchor uses that require changes to current County zoning or Plan Policy, or that requests public financial support, should require developers to submit additional documentation supporting their development proposal including a market and financial feasibility study that discusses economic, fiscal, and traffic impacts.

Plan Policy and Zoning Implications

The HR&A Team evaluated a number of potential catalytic anchor uses at the Loudoun Gateway Station along with possible implications for Plan Policy and/or zoning which may require modifications to enable some of the proposed uses. These are discussed in further detail in Section 4.

- **Conference Center & Hotel**
 - Plan Policy should ensure that the development of a conference center and/or is consistent with the Plan. Only minimal changes are likely to be required.
- **Destination Retail, Entertainment, & Hotel**
 - While many components of a vibrant destination retail and entertainment experience are allowed within the Inner and Outer Core at Loudoun Gateway, some uses which are synergistic with destination retail and entertainment would require changes to Plan Policy

to increase the allowed size of development. Such uses include a Performing Arts Center, an Indoor Recreation Establishment, and large freestanding retail destination. Some revision or clarification to current Plan Policy may be required to support uses which could complement and enhance a destination retail and entertainment center.

- **Research Center**

- Current zoning and Plan Policy should ensure that the development of a research center is consistent with the Plan. Only minimal changes are likely to be required.

- **Tech Incubator**

- The development of a tech incubator in a traditional office building is an allowed use in the Inner and Outer Core. Plan Policy should ensure that this development is consistent with the Plan. Only minimal changes are likely to be required.

- **Sports & Recreation Facility**

- Special Exception is required for an indoor recreation facility which differs from enumerated uses, such as the construction of a facility that is larger than 10,000 SF, and is under three stories tall.
- The Team recommends a revision to zoning to allow for a privately developed recreation facility greater than 10,000 SF but smaller than 100,000 SF. This could create a lifestyle amenity for the region, activate the station area, and encourage additional visitation and spending in Loudoun County.

- **Professional Sports Stadium**

- A stadium or arena is allowed through a Special Exception in the Outer Core land ($> \frac{1}{4}$ mi from station) area under the current PD-TREC zoning.
- While the development of a stadium is consistent with current Plan Policy, it would likely preclude additional PD-TREC development at the Loudoun Gateway Station and require additional study to evaluate its potential merits. If plans for a stadium or arena are submitted to the County, the HR&A Team recommends a detailed study of a stadium use at the Loudoun Gateway Station, including a feasibility assessment, a traffic impact study, Metro-ridership and compatibility and the stadium's potential impact on surrounding development at Loudoun Gateway.

KEY RECOMMENDATION #3:

Work with MWAA to encourage airport-compatible development around the Loudoun Gateway Station, building on national trends favoring “Airport City” models of development near airports.

The HR&A Team recommends exploring a development partnership and agreement between MWAA and the County to position areas adjacent to Dulles Airport, including the Loudoun Gateway Station Area, as an “Airport City” that could attract airport-affiliated development and create economic benefits to both the County and MWAA.

The HR&A Team's analysis produced three key findings which support this recommendation. First, the Team found that “Airport City” models of development are gaining prominence as an opportunity to spur the

regional economy and catalyze growth. Second, Airport Authorities and surrounding communities are entering into development agreements to promote proactive land use planning and align financial interests. Lastly, development agreements can be structured with the flexibility to adapt to changing market conditions.

Plan Policy Implications

The County's TREC Plan Policy should be enhanced to encourage increased cooperation and coordination with MWAA to identify and promote development that is mutually beneficial to MWAA and the County.

KEY RECOMMENDATION #4:

Continue to pursue commercial development at the Ashburn Station Area.

The HR&A Team recommends the County continue to pursue commercial office development at the Ashburn Station Area because it will complement the residential and retail uses that are currently being developed, achieve a premium over non-transit accessible locations, and help enhance the County's image as an attractive location to live, work, and do business.

The HR&A Team's analysis produced several findings which support this recommendation.

- The Team found that stations elsewhere in the region with high development density typically include a mix of commercial office, retail, residential, and entertainment uses;
- Transit accessible commercial office uses can achieve a value premium over less accessible locations; and
- Office development at the Ashburn Station Area will be highly competitive compared with non-transit accessible locations in Loudoun County.

KEY RECOMMENDATION #5:

Allow interim uses to help activate the two Station Areas studied, provide income for property owners, and generate tax revenues. These interim uses should be positioned to be efficiently and easily redeveloped (or converted to another use) when the market for commercial development improves.

Loudoun County has established plan policies to promote high-density development in the Station Areas that will leverage the transit accessibility; however achieving high-density development may take several economic cycles.

Thus, the HR&A Team recommends that the County allow additional uses on an interim basis by special exception in order to promote nearer-term economic activity in the Station Areas, create jobs, and generate tax revenues while preserving opportunities for the higher-density commercial development envisioned in the longer term. Approvals for interim uses should be responsive to market conditions with appropriate checks and balances to ensure that such uses are truly interim, or they risk halting all development. The Team found that other developers and jurisdictions in the Metrorail region are providing interim uses at Station Areas until the currently-challenged regional office market improves. This approach has also been used as part of multi-phase planned development.

Plan Policy Implications

The HR&A Team identified a number of potential interim uses to consider for the Station Areas, including surface commuter parking, lower-intensity retail, big box retail, flex space, and recreational facilities, and reviewed their development potential in light of the County's Plan Policy. While the County's policy and zoning do not specifically address interim uses, they could be facilitated through an expansion of the specific list of uses allowable with special exception permits. A key component of this recommendation is the development of a sunset clause on the special exception permit that would allow the County to periodically review the appropriateness of the use in light of market conditions in the future. Uses that should be allowed by special exception permits as "interim" uses include:

- **Surface Parking**
 - As an interim use, a surface commuter parking lot would be more appropriate for the Loudoun Gateway Station rather than Ashburn, since Loudoun Gateway is surrounded by much more undeveloped land.
- **Low Intensity Retail**
 - Low intensity retail could be an appropriate development opportunity at either the Ashburn or Loudoun Gateway Stations due to its ability to attract customers, create activity, and generate economic revenue for the County.
- **Big Box Retail**
 - The development of Big Box Retail may be better suited for the Loudoun Gateway Station which has less total development and opportunities to more easily develop site infrastructure to support Big Box as an interim development use, such as parking lots and access roads.
 - Developers wishing to propose Big Box retail at the Loudoun Gateway Station should be required to provide a detailed feasibility analysis which supports development of the use which does not conform to Plan policy, and provides an overview of the fiscal and traffic impacts of Big Box Retail at this location. Mitigation strategies should also be provided if the fiscal and traffic impacts are negative.
- **Flex Space**
 - Due to the larger size of flex industrial and light manufacturing uses, the Team recommends Loudoun Gateway as a more desirable location for interim development due to the site's ability to accommodate development with a larger footprint.
 - The Team does not recommend allowing a Data Center as an interim use due to the high development cost of the facilities and supporting infrastructure, which decreases the likelihood of redevelopment.
- **Sports & Recreation Facilities**
 - Any development of recreational facilities at the Station Areas as an interim use should be led by the private market to limit the County's permanent obligation to provide additional recreational facilities in the area immediately around the station areas.

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Section 1 : Existing Conditions

I. INTRODUCTION

The purpose of this section is to summarize existing conditions in Loudoun County as they relate to development at the proposed Loudoun Gateway (Route 606) and Ashburn (Route 772) Metrorail Silver Line Station Areas, key policy and regulatory documents influencing development, and current and planned operations at Washington Dulles International Airport (Dulles Airport). The Loudoun Gateway Station is just north of Dulles Airport and the “Station Area” is a half-mile radius which surrounds the future Metrorail Station, excluding land owned by the Metropolitan Washington Airport Authority (MWAA). The Ashburn “Station Area” is a half-mile radius around the future Metrorail Station. These areas are shown in Attachment 1, Map 1: Study Area Zoning Districts in the Appendix, which shows the half-mile Transit-Related Employment Center (TREC) planned land use radius from the Loudoun Gateway Station and the half-mile Transit Oriented Development (TOD) planned land use radius from the Ashburn Station. Key findings are grouped by:

- I. Station Area Development and Land Use
- II. Economic Conditions in Loudoun County
- III. Trends and Forecasts for Dulles Airport and Regional Airports

The Appendix includes a summary of the key reports and documents reviewed by the Team, along with a summary of interviews conducted with County Staff and local stakeholders consulted during the course of the Team’s research.

II. STATION AREA DEVELOPMENT AND LAND USE

Station Area development is a significant County priority. Loudoun County's Revised General Plan as amended through 2013 designated the areas around the planned Loudoun Gateway and Ashburn Stations as distinct Transit Nodes within its Suburban Policy Area. Loudoun Gateway is planned to be a Transit-Related Employment Center (TREC) and the Ashburn Station will incorporate Transit-Oriented Development (TOD). TREC plan policy allows for a "mix of compatible uses in a high-density, pedestrian, transit-oriented, and compact employment or special activity center,"¹ within a half-mile radius of the proposed station, excluding land owned by Dulles Airport. The PD-TREC zoning at the Loudoun Gateway Station allows commercial development such as office, industrial, retail uses, and special uses, such as a conference or training center, a college or university (exclusive of on-site housing), scientific research and development, an art gallery, library, performing arts center, public spaces, and other large-scale uses enumerated in the revised 1993 Zoning Ordinance.² According to the Briefing Book prepared by Loudoun County for the ULI Technical Assistance Panel, these uses build upon the accessibility of the site and are not impacted by noise effects from Dulles Airport.³ Other development considerations at the Loudoun Gateway Station are potential environmental constraints such as flood plains, wetlands, and some areas of steep grade, and design recommendations that the forthcoming Metrorail station maintain strong pedestrian connections to the surrounding development.

TOD plan policy around the Ashburn Station allows a similar range of uses such as office, retail, entertainment and cultural centers, as well as residential to promote a high-density, pedestrian-friendly environment, within a half-mile radius around the planned station. The Comprehensive Plan dictates that the quarter-mile on the outer edge of the TOD will be a transit-supportive area, a County land-use policy to provide a density and design transition from the higher density TOD to lower density development.

The key difference between the two station areas' planned land use is the inclusion or exclusion of residential uses, which is prohibited under TREC due to the Airport Impact (AI) Overlay District at Dulles. The 65 Loudness Day Night (LDN) noise contours of the AI overlay allows commercial and industrial uses and prohibits residential uses.⁴ To prevent increased traffic impacts from development, the TOD and TREC areas are limited to an FAR of 0.6, unless bus service is provided (which increases the allowable FAR to 1.2). FAR of 2.0 will be allowed upon the complete funding, scheduling and programmed operations of the Metrorail stations.⁵

The land around the Ashburn Station includes some new TOD-style development, but the land use pattern has been inconsistent. Since 1995, the Ashburn Station Area has been planned for TOD development,⁶ which promotes mixed-use development at a higher density to create a more walkable, urban development with

¹ Loudoun County Government Department of Planning, "ULI Washington Technical Assistance Panel Briefing Book," Apr. 2014.

² Loudoun County, Virginia, "Revised 1993 Zoning Ordinance." § 4-1000 PD-TREC.

³ Loudoun County Government Department of Planning, "ULI Washington Technical Assistance Panel Briefing Book," Apr. 2014.

⁴ The Loudoun County Airport Impact (AI) Overlay District zoning ordinance uses the acronym LDN to refer to noise level categories. According to the Zoning Code Section 4-1400 AI-Airport Impact Overlay District, subsection 4-1406 Definitions (A) Ldn: The symbol for "yearly day-night average sound level", which means the 365-day average, in decibels, for the period from midnight to midnight, obtained after the addition of ten decibels to sound levels for the periods between 10 p.m. and 7 a.m., local time. The Federal Aviation Administration uses the acronym DNL (Day-Night Average Sound Level) to refer to the same noise categories. This report uses LDN when referring to the Loudoun County AI Overlay District zoning ordinance and DNL when referring to FAA rules.

⁵ Loudoun County Site Tour, March 25, 2015.

⁶ Metrorail Service District Study, Technical Assistance Panel Briefing Book. Loudoun County Government Department of Planning, April 2014.

Section 1: Existing Conditions

smaller residential units such as apartments and townhomes interspersed with neighborhood-serving retail. Land to the north of the Ashburn Station includes a blend of residential, commercial, and industrial uses, such as Loudoun Station which is a mixed-use development. A majority of the land south of the station has remained undeveloped while waiting for the opportunity to build to a higher density (Moorefield Station). Development south of the station is approved and slated to increase in density with the arrival of the Metrorail Silver line. Three major developments approved for the Ashburn Station are Loudoun Station, Moorefield Station, and the Dulles Parkway Center II. These plans include approvals for more than 8,000 dwelling units and over 12 million square feet of non-residential uses. 9.0 million square feet of data centers lie in direct proximity of the TOD area.⁷ Along with residential and commercial uses, zoning approvals in 2012 increased the allowable number of data center buildings from six to ten, along substations to support the data centers.

While development around the Ashburn Station will eventually reflect the TOD plan, with higher density at the core within a half-mile of the station and decreasing density radiating outwards, the current development pattern at the Ashburn Station Area reflects a blend of low- to medium-density residential, limited commercial development, and large swaths of vacant land. These current development patterns reflect the individual development decisions of landowners who have built low- to medium-density residential, with ground floor commercial development to support residential growth. Due to established proffers and TOD FAR phasing, developers cannot achieve high FARs until the Metrorail is operational.

Around the proposed Ashburn Station, a majority of the land south of the Dulles Greenway remains open fields and is part of Moorefield Station, approximately 582 acres of planned development. At full build out, Moorefield Station will include 6,000 residential units, a majority as townhomes and apartments, and 9.5 million square feet of commercial development. The Moorefield Station site is owned by the Claude Moore Charitable Foundation, which has developed a full site plan for the development that reflects the higher density development goals of TOD Plan Policy. Development of Moorefield Station has begun in Moorefield Village, a subsection of the larger plan. Located outside of a one-mile Transit Supported Area, Moorefield Village is low-density townhomes and apartment buildings next to a small commercial center with a Harris Teeter Grocery Store and small retailers.

Land closer to the proposed Ashburn Station, particularly to the north of the Dulles Greenway and within a half-mile has a blend of residential, commercial such as retail and small office, and industrial uses which include data centers, which have been built by-right and have yet to reach the high-density desired by the TOD planned land use. Notable developments within a half-mile north of the proposed Ashburn Station include:

- **Digital Loudoun:** Ten data centers are currently built. With strong demand for both residential and data center uses, the County will likely face challenges to mitigate the impact of data centers near residential development, which include noise and disruption to the walkable, urban sense of place that TOD plan policy encourages.
- **Loudoun Station:** a mixed-use development approved for 1,514 residential units and 1.9 million square feet of office, hotel, and retail adjacent to Digital Loudoun and will increase the residential density around the Ashburn Station. Current on-site development includes restaurants, residential,

⁷ "Data Center" on Loudoun County Department of Economic Development website. <http://www.biz.loudoun.gov/index.aspx?NID=115>. Accessed April 28, 2015.

Section 1: Existing Conditions

and a theater building with a ground floor restaurant and office space above the theater. The theater opened on April 24, 2015.

- **Ryan Park Center:** a shopping center with a Giant grocery store, Home Depot, and professional office uses. The Ryan Park Center was developed prior to the County's TOD policies and the site is eligible to be redeveloped at a higher density of 16 - 50 dwelling units/acre as the area becomes more transit-accessible. According to County Staff, the shopping center is doing well and there are no plans submitted to redevelop the site in the near-term before the arrival of Metrorail.

Notable developments north of the proposed Ashburn Station, but outside of the half-mile TOD designation include:

- **ATLEY on the Greenway:** a residential development approved in 2013, of 496 luxury apartment units with one, two, and three bedrooms. The residential community offers a community clubhouse, two outdoor pools, and fitness center, and gated interior spaces for residents. Compared to single-family housing in Loudoun County, the ATLEY development represents a higher-density residential development proximate to the Ashburn Station.
- **Verizon Campus:** formerly the MCI WorldCom Office Campus, the site is currently zoned for office and industrial uses with by-right zoning for data centers on the campus. A previous plan for the campus included additional office and retail uses. A recent rezoning proposal requested additional residential units, which is currently prohibited in the current zoning and plan. This proposal is currently inactive by applicant request.

Development adjacent to the proposed Loudoun Gateway Station includes an airport-owned and county-operated commuter parking lot adjacent to the Dulles Greenway with limited private development. The parking lot at the Dulles North Transit Center has access to Route 606, the Dulles Greenway, and Route 634 and includes 750 spaces. Several bus carriers use the Dulles North Transit Center, including the Virginia Regional Transit and Loudoun County Transit, and provide service for commuters to Washington, DC, and key employment centers in Fairfax and Loudoun Counties.⁸ This Transit Center is planned to remain in place after the opening of the Silver Line, and according to the 2011 Station Site Plan Analysis by Dulles Rail Consultants, the proposed commuter parking at the Station is planned to increase from 750 to 2,119 spaces to accommodate a park and ride lot for the Silver Line. Existing development around the future station is characterized by a blend of light industrial uses and unimproved land.

Land around the Loudoun Gateway Station is within the Airport Impact Overlay District, which includes noise contours and a one-mile noise buffer; shown in Attachment 1, Map 2: Airport Impact Overlay District. This District prohibits residential development in areas over 65 LDN. The Loudoun Gateway Station is directly north of undeveloped property owned by Dulles Airport. Mercure Industrial Park is adjacent to the airport-owned property and south of the Loudoun Gateway Station. The Park contains primarily warehousing and other light industrial uses and light manufacturing. The facilities are comprised of one-to-two story industrial buildings. Entitled for development in the late 1980s, the Park has been built out over the last 35 years by several developers.

⁸ "Loudoun County Transportation Prioritization Study for the Area Surrounding the New Metrorail Stations Final Report," Kimley-Horn and Associates, Inc., July 2013.

Section 1: Existing Conditions

Land north of the Station Area is a blend of unimproved and industrial uses. A large component of the unimproved land is the conceptualized at “International City”, owned by Dulles Gateway Associates and TAB I Associates. Conceptual plans envision a 14 million square foot office and industrial park. However, formal development plans and applications have not been submitted to the County, so the land remains a blend of wooded areas and open fields. Northeast of the Loudoun Gateway Station is an additional light industrial park, with interior and exterior storage facilities, manufacturing uses and home to a mix of companies.

Land between the two Stations, primarily along the Dulles Greenway and north, is planned for Keynote Employment, which supports the development of premiere office or research and development facilities, with supporting retail and personal services geared towards employees, as shown in Attachment 1, Map 4: Study Area Planned Land Use. The Keynote Employment planned land use is mapped in areas affected by airport noises and is designed to simultaneously prohibit residential development, while preserving office uses. Since this area is envisioned as the County’s primary employment area, due to proximity to the Dulles Greenway and existing office uses, this policy has limited the development plans of some property owners who wish to include residential development.⁹

Residential growth will require investments in additional transportation infrastructure. The population of Loudoun County is projected to increase by 23% by 2025, for a total gain of 86,106 new residents.¹⁰ These additional residents will place demand on the road infrastructure and increase the number of vehicles in use in the County. In order to mitigate demand on local roads, County staff are positioning the Metrorail stations as alternative transportation options to reduce vehicular traffic. A 2013 study by Kimley-Horn Associates, Loudoun County Transportation Prioritization Study for the Area Surrounding the new Metrorail Station, showed that based on local and regional population and employment forecasts, key roadways, including Route 606 and Route 28, will not meet demand for use during peak AM and PM hours.¹¹

In the same study, Kimley-Horn pinpointed bicycle and pedestrian networks as deficiencies in proximity of the Stations¹² and indicated the County would need to invest in additional infrastructure to connect the Stations to future users. Developers appear to be incorporating the proposed transportation improvements at the Stations and have addressed transportation improvements through the use of proffers to develop bus shelters, bicycle facilities, shared-use paths, and additional road improvements.¹³ The downside of this approach is transportation investments are made on a piecemeal basis as projects are built.

Park & Ride commuters heading to jobs elsewhere in the Capital Region will be an important user group for both stations. Parking facilities will exist at each station to accommodate these commuters. Plans indicate that the Loudoun Gateway Station should accommodate approximately 2,750 cars and the Ashburn Station should accommodate approximately 3,000 cars.¹⁴ Recommendations from a 2014 ULI Technical

⁹ Loudoun County Site Tour, March 25, 2105.

¹⁰ Loudoun County Board of Supervisors Fiscal Impact Committee, “2013 Fiscal Impact Committee Guidelines: Demographic, Economic, and Fiscal Assumptions and Forecasts Draft,” February 2014.

¹¹ Kimley-Horn and Associates, Inc., “Transportation Prioritization Study for the Areas Surrounding the New Metrorail Stations.” July 2013.

¹² Kimley-Horn and Associates, Inc., “Transportation Prioritization Study for the Areas Surrounding the New Metrorail Stations.” July 2013.

¹³ Kimley-Horn and Associates, Inc., “Transportation Prioritization Study for the Areas Surrounding the New Metrorail Stations.” July 2013.

¹⁴ Dulles Corridor Metrorail Project, “Silver Line Stations.” Accessed at: <http://www.dullesmetro.com/silver-line-stations/>

Assistance Panel (TAP) Report emphasized that the proposed parking facilities should support the needs of commuters, but also serve regional activities on nights and weekends. The report also recommended that structured garages not be built closest to the stations, so as to capitalize on the higher value land for other uses. The report suggests that surface lots be left until the market can support below grade parking.¹⁵

Loudoun County enacted three special assessment districts to capture additional value generated by proximity to transit to fund the capital and ongoing operating expenses for Metrorail. The three districts are called the Metrorail Service District, Route 606-Airport Station Service Tax District, and Route 772 Station Service Tax District. The Metrorail Service District is 14,328 acres, and begins at the eastern edge of Loudoun County, encompasses land south to Dulles Airport and goes north to encompass the proposed Metrorail Stations and additional land to the north, as shown in Attachment 1, Map 3: Service Districts.¹⁶ Land within the Metrorail Service District is subject to supplemental real property taxes of no more than \$0.20 per \$100 of the assessed property value, and revenue collected is dedicated to fund the construction and repayment of County financing related to the Metrorail extension.¹⁷

Cognizant of the Metrorail Service District's eventual expiration at the completion of capital construction and repayment of financing for the Metrorail, Loudoun County proactively created the Route 606 Airport Station and the Route 772 Station Service Tax Districts, which are in place but will not charge supplemental real estate property taxes until the expiration of the Metrorail Service District.¹⁸ Real estate in these districts will be assessed a real estate property tax surcharge of \$0.20 per \$100 of assessed value for all development, and revenue will be dedicated towards ongoing payments to Washington Metropolitan Area Transit Authority (WMATA) to support Metrorail transit service. The 606 and 772 Station Service Tax Districts have a smaller footprint than the Metrorail Service District, with the 772 Station Service Tax District extending for about a half-mile north and more than a mile south, while the 606 Station Service Tax District extends about a mile north of the station and encompasses all of the land of the Dulles Airport, as seen in Attachment 1, Map 3: Service Districts.

¹⁵ Urban Land Institute, "Technical Assistance Panel Report: Harvesting the Value of Metrorail in Loudoun County, Virginia," May 2014.

¹⁶ Loudoun County Government Department of Planning, "ULI Washington Technical Assistance Panel Briefing Book," Apr. 2014.

¹⁷ Loudoun County Government Department of Planning, "ULI Washington Technical Assistance Panel Briefing Book," Apr. 2014.

¹⁸ Walsh Colucci Lubeley & Walsh PC, "Loudoun Metro Tax Districts Public Hearing," Oct. 9, 2012. Accessed at: <http://thelandlawyers.com/loudoun-metro-tax-districts-public-hearing/>

III. ECONOMIC CONDITIONS IN LOUDOUN COUNTY

2013 Forecasts for the Board of Supervisors' Fiscal Impact Committee predict that the number of jobs in Loudoun County will increase by 68% between 2015 and 2040, adding 111,379 new jobs.¹⁹ Employment growth is supported by population growth, which is also forecasted to continue growing. Between 2000 and 2014, Loudoun County's population increased by 84% for a gain of 141,712 residents;²⁰ this rate of growth is faster than any other county in the Washington Metropolitan Region.²¹

Employment in Loudoun County is led by Professional, Scientific, Management and Administrative Services, which account for 25%²² of total employment in the County. Rounding out the remaining top five industries include Retail Trade with 13% of total employment, Arts, Entertainment, Recreation, Accommodations and Food Services with 12% of total employment, Educational Services and Health Care and Social Assistance with nine percent and Construction with nine percent of total employment. Employment in the Professional, Scientific, and Tech Services is bolstered by the presence of high-tech government positions, such as U.S. Department of Homeland Security, and supporting government contractors such as Orbital and Raytheon. These companies have been successful in Loudoun County due to access to the high speed MAE-East fiber optic lines in Loudoun County, proximity to Washington, DC, and a highly educated local workforce where 58%²³ of adults have a bachelor's degree or higher. Section 2 of this report provides a more expansive discussion of economic trends in the County and Region.

While focusing efforts on retaining and attracting businesses in the information and communications technology industry, the County has implemented efforts to make itself more amenable to entrepreneurs in general. The Loudoun County Department of Economic Development reports that 87% of the County's businesses employ less than 20 people. Recent initiatives include iNNOVATE LoCo, a tech pitch competition for County-based entrepreneurs, and co-sponsorships of programming at the Loudoun Small Business Development Center, the Mason Enterprise Center, the Northern Virginia Technology Council and the Center for Innovative Technology.²⁴ Aware of potential challenges of an economy built upon one sector, County staff has recognized the need to promote the growth of distinct industries to diversify the local economy. Such initiatives include the creation of a Viticulture and Enology Education Center to develop a workforce for the County's burgeoning wine and tourism industry.²⁵

Building upon the County's desire to support entrepreneurial firms and small start-up companies, the ULI TAP Report advocated for flexible office and mixed-use spaces which could provide adaptive workspace and co-working locations which may align with the workplace preferences of a younger generation. Along with flexible work environments, the ULI TAP Report advocated development that creates an urban, convenient, and diverse environment that creates a desirable location to both work and live.

¹⁹ Loudoun County Board of Supervisors Fiscal Impact Committee, "2013 Fiscal Impact Committee Guidelines: Demographic, Economic, and Fiscal Assumptions and Forecasts Draft," February 2014.

²⁰ U.S. Census American Community Survey Population Results for Years 2000 and 2010.

²¹ "Analysis of Population and Employment Forecasts for the Washington DC Region 2010 to 2014," by Renaissance Planning Group for the Metropolitan Washington Airports Authority, October 2011.

²² County Business Patterns, U.S. Census Bureau. "2013 County Business Patterns (NAICS)." Accessed April 2015.

²³ Loudoun County Department of Economic Development, "Education and Demographics Fact Sheet," accessed April 2014.

²⁴ Loudoun County, Virginia Department of Economic Development, "Annual Report 2014: Fiscal Year July 1, 2013 – June 30, 2014."

²⁵ Loudoun County, Virginia Department of Economic Development, "Annual Report 2014: Fiscal Year July 1, 2013 – June 30, 2014."

Data centers have played an important role in the county's development in the technology and communications sector, as well as expanding its tax base. Currently there are 56 data center facilities in the county with 5.6 million square feet of space²⁶ and up to 70% of the world's internet traffic flows through data centers in Loudoun County.²⁷ These operations support more than 3,000 technology companies and an additional 125 acres of land in Loudoun County has been purchased for the expansion of data centers²⁸. The success of the data centers is due to direct access to the MAE-East fiber optic line and affordable power. Data centers are important revenue generators, helping to bring in over \$60 million in County revenue, or 5% of the County's Total General Funds.²⁹

Yet as Loudoun County has experienced population growth, the presence of data centers has created tension with residents who are adverse to the noise and nuisances created by data centers. Negative externalities include a constant level of noise and the release of steam plumes from individual data centers, and large development footprints that do not align with a higher-density development pattern seen in urbanized residential and commercial areas. Low job density at each data center also deters from the long-term economic growth of the County, while other economic engines, such as an office building create a higher number of employees per square foot. However, with substantial financial investments in each data center facility and the unique presence of the MAE-East fiber optic lines, data centers will remain a key driver of the local economy. As the residential presence in Loudoun County increases, the County will need to accommodate the presence of both data centers and residents.

The arrival of Metrorail is projected to increase the total amount of development in Loudoun County, the rate at which it occurs, and the value of the development, according to previous studies. With the imminent arrival of Metrorail, the County is poised to capture the benefits of Metrorail accessibility as more and more people seek jobs and housing at locations, which offer connectivity to the region via Metrorail and the world via Dulles Airport. Based on population projections of regional growth in Loudoun and Fairfax Counties, the two stations are poised to capture a large share of the regional growth for Loudoun County. According to a 2012 market analysis by RCLCO, the presence of the Metrorail Stations in Loudoun County is expected to increase the total amount of residential, office, retail, and hotel development in the County at a value of \$425 million dollars above baseline development projections without Metrorail development through 2040. The study indicated development is more likely to occur close to the Metrorail and the appeal of proximity to Metrorail will result in increased value for those developments, leading to higher-density construction, and higher assessed value and real estate tax revenue for the County. Based on Metrorail's arrival, RCLCO's development projections included an additional 1.4 million square feet of office (an increase of six percent) above a baseline of 23 million square feet of office demand; a gain of 4,837 new housing units (an increase of nine percent) above the baseline of 51,646 projected units; 670,000 new square feet of retail (nine percent increase) above a baseline of 7.6 million square feet of retail; and an additional 294 hotel rooms (six percent increase) above a baseline of 5,159 hotel rooms in Loudoun County.

²⁶ Loudoun County, Virginia Department of Economic Development, "Annual Report 2014: Fiscal Year July 1, 2013 – June 30, 2014."

²⁷ Loudoun County Department of Economic Development, "Data Center Fact Sheet," accessed April 2014.

²⁸ Loudoun County Department of Economic Development, Key Business Sectors, Data Centers, Accessed April 2014.

²⁹ Loudoun County, Virginia Department of Economic Development, "Annual Report 2014: Fiscal Year July 1, 2013 – June 30, 2014." Washington Post, "Data centers boom in Loudoun County, but jobs aren't following", January 17, 2014. Accessed April 15, 2015 at: http://www.washingtonpost.com/business/capitalbusiness/data-centers-boom-in-loudoun-county-but-jobs-arent-following/2014/01/17/b4a704c8-7f0e-11e3-93c1-0e888170b723_story.html. Loudoun County Government FY 2014 Adopted Fiscal Plan, accessed April 15, 2015 at: <http://www.loudoun.gov/DocumentCenter/View/90162>

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The recovery of the office market in Northern Virginia will influence the future development potential of office in Loudoun County. Current market conditions in the Northern Virginia office market indicate a vacancy rate of 17.5% and the development of new office has drastically declined, suggesting the office market has several years before development returns, and in the short-term new office construction will be for build-to-suit tenants.³⁰ Additional office development will also directly compete with Fairfax County, specifically the nearby Tysons Corner and Route 28 which are also positioned for office development. While office market growth is projected in Loudoun County, the development of office product in Loudoun County will be greatly influenced by the recovery of the office market in Northern Virginia and the ability to align new development in Loudoun County with the demands of local office tenants.

Section 2 of this report provides a more detailed discussion of market trends and an outlook for non-residential uses.

³⁰ CBRE Research, Q4 2014. Marketview Northern Virginia Office.

IV. TRENDS AND FORECASTS FOR DULLES AND REGIONAL AIRPORTS

Dulles International Airport (IAD) is one of three major airports in the Washington Metropolitan region, including Reagan National Airport (DCA), also owned and operated by the Metropolitan Washington Airports Authority (MWAA), and Baltimore/Washington International Thurgood Marshall Airport (BWI), owned and operated by the Maryland Aviation Administration. Of the three airports, Reagan National is currently the only airport with direct rail access via Metrorail, while Baltimore International is serviced by MARC and Amtrak lines which require air travelers to transfer to a bus to reach the terminal, while plans for the Silver Line extension will connect Dulles International Airport to Metrorail service around 2018.

Since 2010, total passenger volume at Dulles Airport has decreased while regional competitors have seen increases in passenger volumes. Much of this trend can be explained by more competitive conditions at Reagan National due to changes in Federal government policies which eliminated some of the perimeter rule constraints at Reagan National allowing for non-stop flights to destinations which had been previously served from Dulles Airport. In addition, the FAA 2012 Reauthorization bill increased the number of slots at Reagan National Airport, and the number of airlines serving Reagan National has increased. Simultaneously, BWI Airport has pursued aggressive economic incentives and pricing by airlines operating at the Airport to attract domestic passengers from the region. However in light of regional competition, Dulles Airport has maintained and increased its position as the top regional airport for international passenger traffic. Forecasts from the 2013 Washington-Baltimore Regional Air Passenger Origin Destination project that Dulles Airport will overtake BWI in terms of total passengers by 2015 to become the dominant Metropolitan area airport (by passengers served) over the next 25 years.³¹

Figure 1-1: Economic Impact – Jobs, Labor Income, and Taxes (2012)³²

| Location | Dulles Airport | | | Reagan National Airport | | |
|-------------------------|----------------|----------------------------|-------------------------------------|-------------------------|----------------------------|-------------------------------------|
| | Jobs | Labor Income (\$ millions) | State and Local Taxes (\$ millions) | Jobs | Labor Income (\$ millions) | State and Local Taxes (\$ millions) |
| Virginia | 146,122 | \$5,944.90 | \$612.90 | 48,916 | \$1,944.80 | \$205.20 |
| Loudoun County | 18,692 | \$796.36 | \$78.40 | 2,972 | \$128.40 | \$12.50 |
| District of Columbia | 68,345 | \$2,505.2 | \$378.0 | 54,076 | \$1,987.5 | \$299.1 |
| Maryland | 33,239 | \$1500.0 | \$208.5 | 20,738 | \$750.8 | \$130.1 |
| Total Metropolitan Area | 247,706 | \$9,950.00 | \$1,199.40 | 123,730 | \$4,683.10 | \$634.40 |

Ongoing operations at Dulles Airport create a range of fiscal and economic impacts in Loudoun County and the Commonwealth of Virginia. Multiple indicators of the economic impacts of Dulles Airport and Reagan National Airport were explored, including total number of jobs (both airport and visitor generated), labor income, and state and local tax dollars (only for 2012), for Virginia, the District of Columbia, Maryland, and the overall metropolitan area. Dulles Airport generated over 247,000 jobs compared to less than 123,000 by Reagan National, and Dulles Airport generated close \$10 billion in labor income and \$1.2 billion in State and Local taxes. When comparing Dulles Airport and Reagan National, Dulles Airport creates more than two times the jobs in Virginia and the most labor income in the metropolitan study area. Additionally Dulles Airport generates a significant \$78.40 million in state and local taxes in Loudoun County, compared to \$12.5 million generated by Reagan National. Additional detail on the trends and forecasts for Dulles Airport and regional airports can be found in Attachment 5 of the Appendix.

³¹ Forecast passengers based on 2x the number of estimated enplanements from Washington – Baltimore Regional Air Passenger Origin Destination Forecast Update (May 23, 2013).

³² Economic Impact for Dulles and Reagan National from MWAA 2012 Economic Impact Study.

V. IMPLICATIONS FOR THE MARKET ASSESSMENT

Based on the Team's understanding of the current conditions in Loudoun County, informed by a review of key documents, discussions with County Staff, and a site-tour of the Station Areas, the following bullets provide thoughts on implications for development at the proposed Station Areas.

- The expansion of the Silver Line will enhance Loudoun County's already strong economic fundamentals by enabling the development of walkable, transit-oriented development that is highly desirable in today's commercial and residential markets.
- Large parcel sizes and relatively few owners in the areas around the stations create potential for large scale development.
- The current TREC zoning at the Loudoun Gateway Station, along with a Keynote Employment policy area promotes high density, employment-centric uses, prohibiting residential. While current market conditions are more favorable to residential, station development will take place over several market cycles.
- Dulles Airport is an important economic anchor and the County must work with MWAA to address current challenges the airport is facing from regional and national competition.
- Parking to meet regional commuter needs is an important component of development around the stations and must be considered as part of development plans.

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Section 2: Regional Real Estate Market Analysis

I. INTRODUCTION

The HR&A Team conducted a market analysis for the planned Loudoun Gateway and Ashburn Stations. The team assessed demographic and economic trends, current real estate market conditions, conducted interviews with stakeholders, and analyzed trends in global airport-adjacent development. Based on this assessment, the Team developed an initial outlook for non-residential uses with the identification of potential anchors. The Team's research builds upon the review of existing conditions and previous plans in Section 1; sets the framework for a deeper dive into airport land use compatibility case studies in Section 3; and will ultimately inform the Team's recommendations to the County regarding development in the two Silver Line Station Areas in Section 4.

Key findings from interviews with stakeholders can be found in Attachment 4 in the Appendix.

II. LOCATIONAL ADVANTAGES OF STATION AREAS

After years of intensive planning and construction, since 1971, Loudoun Gateway and Ashburn, the final planned Silver Line stations, are expected to open by 2020. Their opening will provide Loudoun County with Metrorail transit for the first time and further enhance its status as a county with a high quality of life by increasing transportation mode choice and connectivity for workers, residents, and visitors.

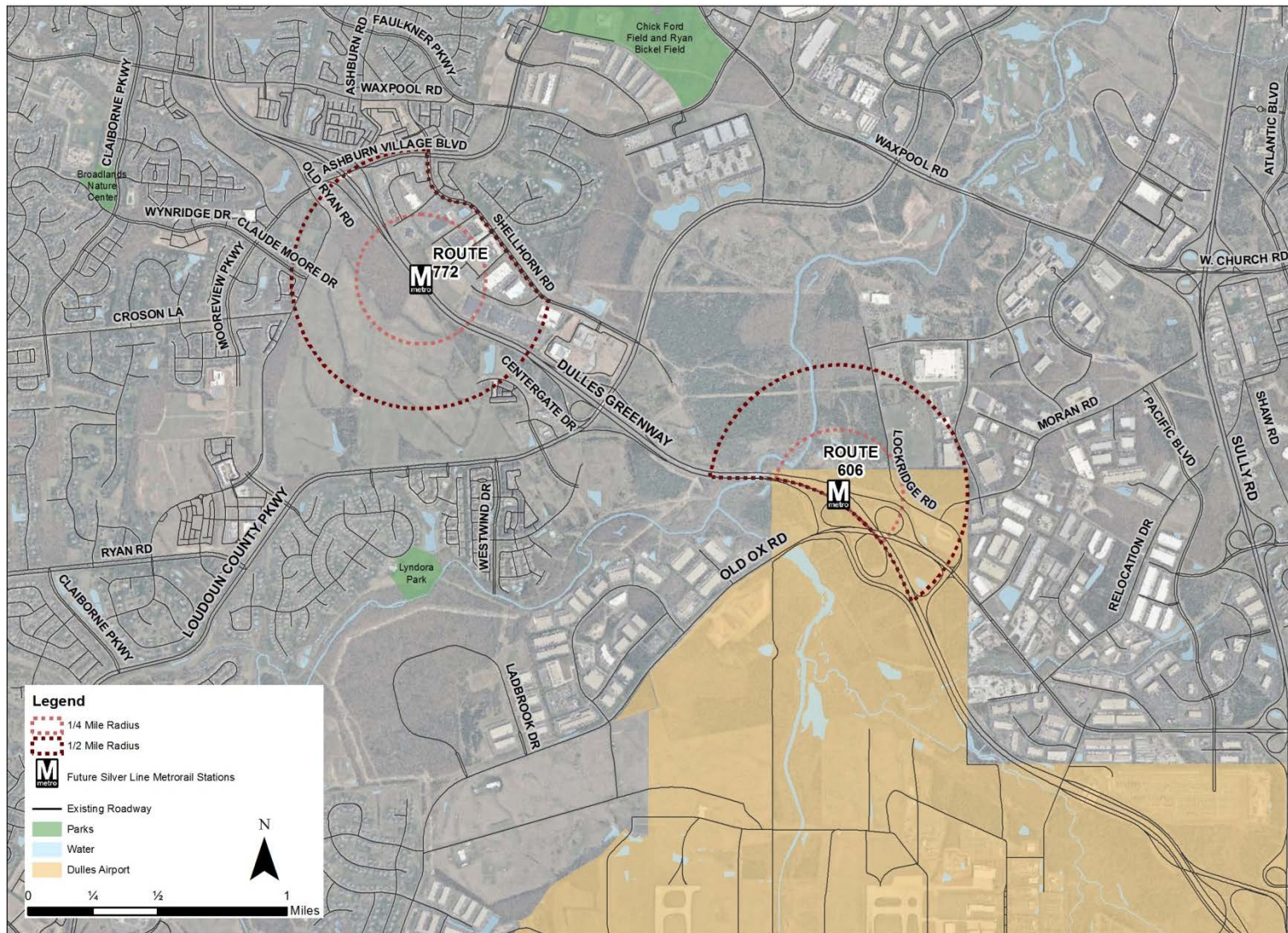
Along with rail access, the new stations bring the potential for the development of higher-density real estate in a walkable, transit-oriented community. This development model is very successful in the current market, with locations within a half mile of Metrorail stations representing 92.3% of overall office leasing activity in the Washington, DC region.¹

The arrival of the Silver Line offers the opportunity to unlock development value at the Station Areas, by connecting the region to Dulles Airport and to other employment and entertainment destinations along the rail network and to Washington, DC. The Loudoun Gateway and Ashburn Stations will be one and two station stops away, respectively, from the Dulles Airport Station, enabling Metrorail riders to easily travel between the locations within minutes. Proximity to Dulles Airport offers a unique opportunity to identify and promote airport-compatible development to catalyze a regional development strategy. Loudoun County offers a range of amenities which further enhance the economic development potential created by the arrival of Metrorail's Silver Line.

¹ Jones Lang LaSalle. "Metro DC Quarterly Office Sales Volume Tops \$1.5 B." April 2, 2015. Accessed at: <http://www.us.jll.com/united-states/en-us/news/3356/metro-dc-quarterly-office-sales-volume-tops-1b>.

Section 2: Regional Real Estate Market Analysis

Figure 2-1: Station Area Map and Dulles Airport



Source: Kimley-Horn

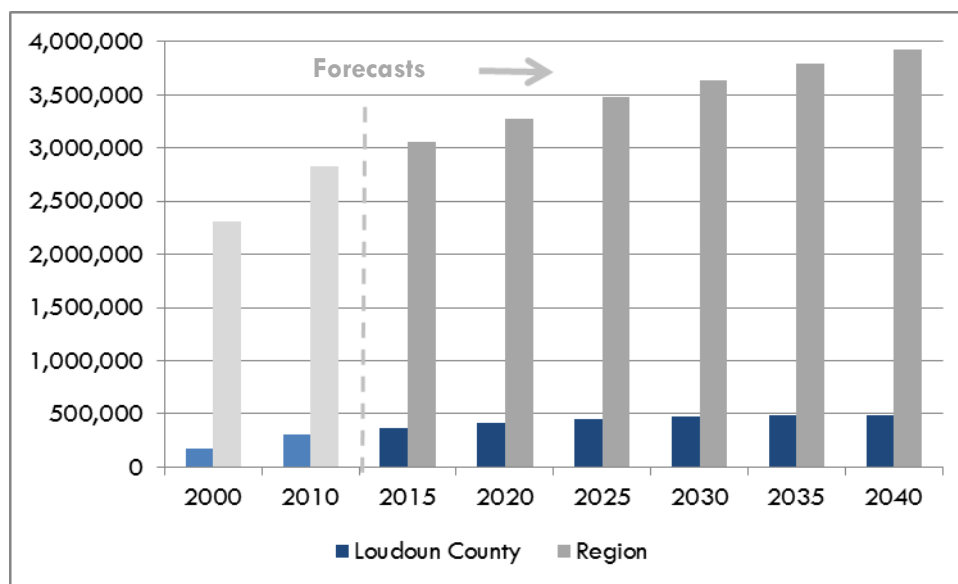
III. ASSESSMENT OF REGIONAL & LOCAL DEMOGRAPHIC & ECONOMIC FACTORS

HR&A reviewed regional market studies and forecasts for Loudoun County, the Washington Metropolitan Area, and the United States, and conducted a market assessment to identify local drivers of demand which could impact the development around the Loudoun Gateway and Ashburn Stations.

DEMOGRAPHIC DEMAND DRIVERS

Loudoun County is characterized by a growing, highly educated and wealthy population. In 2015, Loudoun County's population is forecast to reach 367,096 residents,² an increase of 116% over its population in 2000 (169,599 residents).³ The County's population growth rate from 2000 - 2015 far surpassed the population growth rate in the Region, which grew by 32% over the same period, increasing from 2,309,956 people in 2000 to 3,059,808 people in 2015.⁴ Forecasts for countywide population growth estimate 488,111 residents by 2040,⁵ which is an increase of 33% over its 2015 population. The rapid population growth rate has fueled real estate development in the County for a range of product types, particularly residential and retail uses.

Figure 2-2: Population Trends and Forecasts, 2000 – 2040



Source: MWCOG Round 8.3 Cooperative Forecasting, 2013 Fiscal Impact Committee Guidelines: Demographic, Economic, and Fiscal Assumptions and Forecasts Draft.

² Loudoun County, Demographic Forecasts. "County Forecast Series." Accessed Jun 19, 2015.

³ Loudoun County, Demographic Estimates. "Sub-County Current Estimate Series – Planning Subarea." Accessed Jun 19, 2015.

⁴ Metropolitan Washington Council of Governments. "Round 8.3 Cooperative Forecasting: Employment, Population, and Households." Published 10/15/2014. Accessed May 2015.

⁵ Loudoun County, Demographic Forecasts. "County Forecast Series." Accessed Jun 19, 2015.

In addition to rapid population growth, Loudoun County ranks at or near the top of all U.S. counties for median household income,⁶ which was \$122,238 in 2014. This compares very favorably to an overall regional median household income of \$90,540 and an overall national median household income of \$53,046.⁷

Figure 2-3: Median Household Incomes, Nation, MSA, & Loudoun County, 2014

| Location | Median Household Income | Difference from National Average |
|--------------------|-------------------------|----------------------------------|
| United States | \$53,046 | -- |
| Washington, DC MSA | \$90,540 | 71% |
| Loudoun County | \$122,238 | 130% |

Source: U.S. Census Bureau, 2009 – 2013 ACS 5-Year Estimates

The high median household income in Loudoun County is a function of its highly educated population and concentration of high-skilled jobs. Fifty-eight percent of the residents hold a bachelor's degree or higher.⁸ This figure is 10 percentage points higher than the Washington, DC MSA's rate of 48% and 29 percentage points higher than the national average of 29%. The County invested in the school district over the previous 15 years to provide quality educational opportunities for new students and Loudoun County Public Schools has 86 current schools and plans for an additional 23 schools to keep up with the projected population growth.⁹

Figure 2-4: Percentage of Population with a Bachelor's Degree or Higher, 2013

| Location | Percentage of Population with Bachelor's Degree or Higher |
|--------------------|---|
| United States | 29% |
| Washington, DC MSA | 48% |
| Loudoun County | 58% |

Source: U.S. Census Bureau, 2009 – 2013 ACS 5-Year Estimates

Loudoun County experienced a large increase in its foreign-born population between 2000 and 2013. The County's foreign-born population grew from 19,116 in 2000 to 74,470 in 2013, or a 290% increase.¹⁰ Overall, the percentage of the population that is foreign-born more than doubled from 11% to 23%.¹¹ This growth mirrors a regional trend and the percentage of foreign-born residents is comparable to other suburban counties. In Loudoun County in 2013, 48% of foreign-born residents worked in management, business, science, and the arts.¹² Meanwhile, 41% earned over \$75,000 per year.¹³ The growth in the County's foreign-born residents is significant because it signals demand for access to

⁶ Due to similar median household incomes within a margin of error within each other, the U.S. Census no longer ranks Counties by median household incomes. An analysis by HR&A of median household incomes for all Counties in the U.S. indicates that Loudoun's median household income is one of the highest in the nation.

⁷ American Community Survey, U.S. Census Bureau. "Selected Economic Characteristics, 2009 – 2013 American Community Survey-Year Estimates." Accessed May 19, 2015.

⁸ American Community Survey, U.S. Census Bureau. "Educational Attainment, 2009 – 2013 American Community Survey-Year Estimates." Accessed May 19, 2015.

⁹ Conversation with County Staff, Loudoun County Site-Tour. March 25, 2015.

¹⁰ American Community Survey, U.S. Census Bureau. "Selected Characteristics of the Native and Foreign-born Populations, 2009-2013 American Community Survey 5-Year Estimates." Accessed May 19, 2015.

¹¹ Ibid.

¹² Ibid.

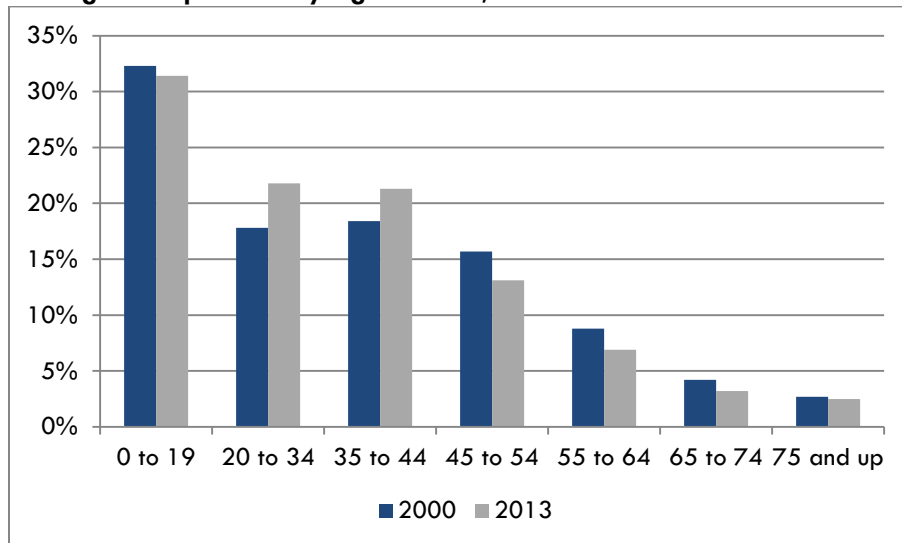
¹³ Ibid.

Section 2: Regional Real Estate Market Analysis

international travel and employment opportunities for the highly-skilled individuals who migrate to the Washington area to pursue careers.

As Loudoun County's population has grown, it has seen larger growth in residents aged 20 to 34, which increased by four percentage points in terms of share of total County population, and residents aged 35 to 44, which increased by three percentage points. In other age cohorts, the percentage of the population decreased between 2000 - 2013, further demonstrating the County's significant population gains was disproportionately driven by individuals aged 20 - 44.

Figure 2-5: Percentage of Population by Age Cohorts, 2000 - 2013



Source: U.S. Census Bureau, 2009 – 2013 ACS 5-Year Estimates & Census 2000 Summary File SF1

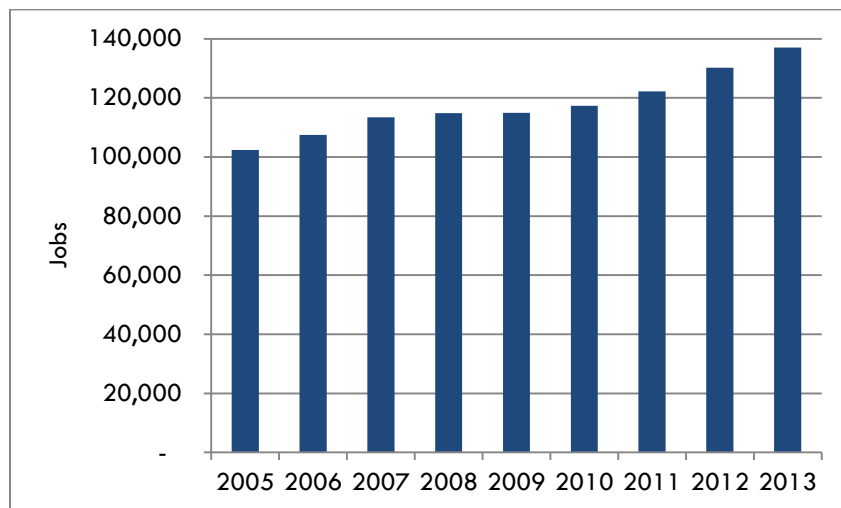
Loudoun County's rapid population growth creates demand for new housing units. From 2000 – 2013, the 20 to 44 year age cohorts saw positive increases as the relative percentage of the total population. Growth in these age cohorts (20 to 44 years) suggests both demand for apartments, townhouses, and single family homes and that Loudoun is attracting newly formed households and those with families. Coupled with the higher than average median household incomes, households in Loudoun County have a high retail buying power, which creates demand for new shopping, entertainment, and recreational opportunities. Continued residential growth also supports the development of office market sectors, such as medical office and small professional services, which support resident needs.

ECONOMIC DEMAND DRIVERS

In addition to demographics, economic activity is a key factor affecting demand for real estate. This next section highlights important trends in the economy relating to employment, in the wider metropolitan area and the economy in Loudoun County itself.

Loudoun County's economy is characterized by a high concentration of professional services firms, including technology and government contracting. In 2013, there were 137,022 total jobs in Loudoun County which is an increase of 34% over the 102,408 jobs in Loudoun County in 2005.¹⁴

Figure 2-6: Loudoun County Annual Employment, 2005 – 2013



Source: U.S. Census Bureau, County Business Patterns 2005-2013.

The strength of the government contracting and other technology and management service industries in Loudoun is demonstrated by the high concentration of employment in professional, scientific, management, administrative and waste management services sector. Some 25% of total employment in Loudoun County is in this sector and this concentration of employment is nearly twice that of the next largest sector in the County, retail trade with 13% of total employment.¹⁵ While the professional, scientific, management, administrative and waste management services sector is the largest concentration of employment in Loudoun County, the percentage concentration is seven percentage points lower than the concentration in the region overall (32%). Further differentiating Loudoun County from regional employment trends is the County's higher percentage of employment within Construction, Transportation and Warehousing, and Utilities, and Manufacturing industries. This concentration is a result of the County's exurban location where relatively lower land values support large-scale operations (such as manufacturing and warehousing) and the high rate of growth that has spurred new construction activity. Relative employment in these sectors may decrease over time as Loudoun County becomes more developed.

¹⁴U.S. Census Bureau. "County Business Patterns, 2005 – 2013." Accessed May 19, 2015.

*Total job number for Loudoun County includes estimates of total jobs within some NAICS categories reported by the County Business Patterns which reflect a range of total jobs to protect the privacy of industries with a limited number of firms.

¹⁵ County Business Patterns, U.S. Census Bureau. "2013 County Business Patterns (NAICS)." Accessed April 2015.

Figure 2-7: Employment by Sector (2013)

| | Washington MSA | | Loudoun County | |
|--|------------------|-----|----------------------|-----|
| Professional, scientific, and management, and administrative and waste management services | 802,834 | 32% | 34,452 | 25% |
| Retail trade | 267,783 | 11% | 18,396 | 13% |
| Arts, entertainment, and recreation, and accommodation and food services | 301,800 | 12% | 16,359 | 12% |
| Educational services, and health care and social assistance | 393,289 | 16% | 12,732 | 9% |
| Construction | 138,115 | 5% | 11,712 | 9% |
| Transportation and warehousing, and utilities | 60,666 | 2% | 9,663 | 7% |
| Information | 99,517 | 4% | 8,816 | 6% |
| Manufacturing | 48,828 | 2% | 7,500* ¹⁶ | 5% |
| Other services, except public administration | 190,091 | 8% | 6,428 | 5% |
| Finance and insurance, and real estate and rental and leasing | 151,045 | 6% | 5,983 | 4% |
| Wholesale trade | 58,922 | 2% | 4,747 | 3% |
| Agriculture, forestry, fishing and hunting, and mining | 1,361 | 0% | 234* | 0% |
| Total Civilian Employment | 2,514,251 | | 137,022 | |

Source: U.S. Census, County Business Patterns 2013

Due to federal sequestration, the gross regional product of the Washington Metropolitan Area has lagged that of other large metro areas. Federal sequestration has heavily impacted the Washington, DC Metro region where a large percentage of regional employment is derived from federal spending. Estimates from the Commonwealth of Virginia indicate that up to 30% of the state's economy is tied to federal spending.¹⁷ Between 2011 and 2013, the total value of federal contracts decreased by 19% - from \$83.1 billion to \$69.6 billion.¹⁸ In the Washington Metropolitan Area, federal procurement decreased by 16% between FY2010 and FY2013.¹⁹ Based on federal spending reductions, Dr. Stephen Fuller of George Mason University's Center for Regional Analysis estimated that over 10 years, Virginia would lose 102,525 jobs with an income loss of \$4.4 billion.²⁰ From November 2013 to November 2014, Northern Virginia alone lost 20,000 federal and private-sector defense related jobs due to reductions in federal spending.²¹

Despite losing a number of federal and defense-related private sector positions, the Washington Metropolitan Area has experienced modest overall job growth between 2009 - 2013, a large share of which has occurred in the leisure and hospitality sector, retail trade, and other lower paying positions. Growth in leisure and hospitality employment was a response to increasing demands for local services

¹⁶ *Categories where the County Business Patterns provided a range of possible employees and HR&A use the mid-point of the range to estimate total jobs in Loudoun County.

¹⁷ The Commonwealth of Virginia. "New Virginia Economy." Accessed May 12, 2015 at:

<https://governor.virginia.gov/media/3501/new-virginia-economy-12052014.pdf>

¹⁸ George Mason University CRA. "Improving the Washington Region's Global Competitiveness." Prepared for the 2030 Group. November 2014.

¹⁹ George Mason University CRA. "Update from the U.S. Bureau of Economic Analysis, Washington Metropolitan Area Gross Regional Product, 2001-2013." September 2014.

²⁰ Commonwealth of Virginia, House Appropriations Committee Retreat. "Update: Impact of Federal Budget Reductions on Virginia's Budget." Nov 18, 2014.

²¹ Commonwealth of Virginia, House Appropriations Committee Retreat. "Update: Impact of Federal Budget Reductions on Virginia's Budget." Nov 18, 2014.

driven by population growth in the Washington Metropolitan Area. While positive job growth is good for the regional economy, the growth has been concentrated in lower skill and lower wage sectors with limited long-term mobility and growth potential.

Figure 2-8: Washington Metropolitan Area Ranked Industry Growth and Median Annual Earnings, 2009-2013

| Industry (Ranked by net change in resident workers, 2009 to 2013) | Median Annual Earnings (\$) | Net Change in Resident Workers |
|--|------------------------------------|---------------------------------------|
| Leisure & Hospitality | 20,020 | +44,780 |
| Health Services | 40,060 | +37,690 |
| Retail Trade | 23,550 | +32,870 |
| Professional Sciences and Tech Services | 85,810 | +32,630 |
| Public Administration | 89,070 | +28,360 |
| Educational Services | 43,840 | +27,550 |
| Admin & Support & Waste Management | 31,910 | +22,820 |
| Other Services | 35,820 | +22,650 |
| Construction | 36,800 | +12,930 |
| Transportation & Utilities | 47,980 | +6,480 |
| Financial Activities | 58,700 | +3,710 |
| Wholesale Trade | 47,000 | +3,400 |
| Agricultural & Natural Resources | 30,400 | +1,960 |
| Manufacturing | 61,450 | +890 |
| Management | 81,800 | +110 |
| Information | 71,270 | -7,830 |

Source: GMU Center for Regional Analysis

Based on the current political dynamics on Capitol Hill, reductions in federal spending are likely to continue and negatively impact the Washington Metropolitan Area economy in the coming years. Without regional diversification of the local economy and growth in well-paying jobs, forecasts from George Mason University's center for Regional Analysis project that the regional economy will remain sluggish. The impact of sequestration will be stronger in Northern Virginia which has a higher concentration of defense related contracting, meanwhile, federal agencies located in Maryland, such as the Food and Drug Administration, National Institutes of Health and the National Institute of Standards and Technology are less reliant on defense spending and are likely to receive federal research funding.²²

In response to reduced federal sector spending, Loudoun County has sought to diversify the local economy and is looking at small business entrepreneurs and technology firms as opportunities to create growth in new industries. To foster the growth and development of small businesses, Loudoun County Government has encouraged the development of several small-business incubators including the Mason Enterprise Center and the Loudoun Small Business Development Center which provide a range of services such as counseling, training, seminars, mentoring, marketing support, and access to capital for small businesses. The goal of these efforts is to reduce the County's reliance on federal spending as the only driver of economic growth.

²² George Mason University CRA. "Improving the Washington Region's Global Competitiveness." Prepared for the 2030 Group. November 2014.

Section 2: Regional Real Estate Market Analysis

An industry with the potential to lead the diversification efforts in Loudoun County is the tech sector, which benefits from several assets in Loudoun County and the region. According to a 2014 study by the George Mason University Center for Regional Analysis (CRA) entitled *Improving the Washington Region's Global Competitiveness*, factors driving growth in the tech sector include:

- MAE-East Fiber optic cable providing broadband capacity;
- A highly educated workforce;
- A large and growing workforce population (ages 20 – 44); and
- Lower rents for office space and relative wages compared to other top-tier tech cities.²³

The tech sector has quickly responded to the locational benefits in Washington DC and the region, and the Washington area experienced, a nearly 16% growth in tech talent between 2010 and 2013.²⁴ Supporting the continued growth of tech talent and its associated positions will simultaneously support development in the larger economy since more than 60% of tech jobs are located outside of the core high-tech industry.²⁵ Related tech industry positions can be found in education, government, and healthcare, and these workers can help generate innovation and advances that can boost the whole economy.²⁶

However, the attraction of tech positions to Loudoun County faces significant regional competition from other jurisdictions, especially Washington, DC, which has been aggressive in offering incentives to attract tech firms. The District government developed “Digital DC”, a marketing campaign and economic development initiative to promote DC as an innovation and high-tech economy. Under Mayor Gray, the District established a \$1 million catalytic fund and customized mentorship program dedicated to promoting the success of early and growth state technology ventures.²⁷ To promote a clustering effect of technology firms and generate spinoff economic development, the District established a “Tech Corridor” from 7th St, NW/New York Ave, NW to Georgia Ave, NW/Kansas Ave, NW. Tech firms that locate within the boundaries of the corridor are eligible for grants of \$25,000 - \$200,000 to support company development and expansion.

²³ CBRE Research. “Scoring Tech Talent, Influencing Innovation, Economic and Real Estate Growth in 50 U.S. Markets.” 2015.

²⁴ CBRE Research. “Scoring Tech Talent, Influencing Innovation, Economic and Real Estate Growth in 50 U.S. Markets.” 2015.

²⁵ Ibid.

²⁶ Ibid.

²⁷ Washington, DC Economic Partnership. “Map of the Month: Digital DC Tech Opportunities Corridor and Available Sites.” <http://www.wdcep.com/map-of-the-month-digitaldc/>. Accessed on May 6, 2015.

KEY CONCLUSIONS FROM DEMOGRAPHIC AND ECONOMIC ANALYSIS

- Loudoun County's rapid population growth, which has outpaced the region, is expected to continue. Population growth creates positive ongoing demand for new real estate development across a range of product types. The real estate implications of this trend are demand for new residential units and space for services supporting residents and residential development.
- The highly educated population is and will continue to be attractive to employers looking to grow or locate in Loudoun County. Demand for new office space will be tempered by the market's ability to absorb existing vacant office space and demand for new, modern office facilities from existing jobs and new job growth.
- High median household income and a growing population translate into strong spending power in the county. The real estate impact of this trend is new demand for retail, entertainment and recreational opportunities.
- The County has a number of physical assets, including an international airport, planned rail access, road networks, and access to recreational opportunities that will continue to make it a desirable place to live and do business.
- Despite the challenges in the market due to a sluggish Federal sector, the County has strong economic fundamentals and policy efforts to diversify the economy that will help it remain competitive going forward.

IV. REAL ESTATE MARKET CONDITIONS

HR&A reviewed recent market reports and conducted a high-level market analysis of office, retail, residential, hospitality, and industrial uses to identify potential opportunities for development at the Station Areas. HR&A supplemented this data analysis by interviewing local and regional stakeholders regarding local and regional economic conditions and real estate markets.

STATION AREAS

Development around the Loudoun Gateway Station Area has been limited and reflects an auto-centric development pattern. Nearby land uses include the park and ride lot and light industrial development. The primary development around the Loudoun Gateway Station is the Dulles North Transit Center which utilizes the site's connectivity to Route 606, the Dulles Greenway and Route 634 to provide a convenient commuter parking lot to transfer commuters into buses which run to employment centers in Washington D.C, Fairfax County, and other eastern employment destinations. Additional existing development includes manufacturing and industrial uses which rely upon trucks to transport materials to and from the station area. In addition, the challenging market for new office development, combined with a prohibition on residential uses per the Airport Impact Overlay Zoning District at Loudoun Gateway has limited private development of office and residential uses. A development pipeline, of potential development in the Loudoun Gateway area includes plans for the Loudoun Parkway Center – South, a 137 acre site with an available development density of 1,250,000 square feet of office and a full-service hotel.²⁸ Additional pipeline development includes a potential 325,000 square foot, class B office building by Antigone Realty.²⁹ Both sites are outside of the immediate Loudoun Gateway Station Area and envisioned at the interchange of the Loudoun County Parkway and Dulles Greenway. The existing development pipeline around Loudoun Gateway adheres to the current low-density development typology and does not fully take advantage of the potential density and mixed-uses found at traditional transit-oriented developments.

Development patterns at the Ashburn Station mirror the larger market patterns in Loudoun County which support residential and office development with little demand for office space. Within a half-mile of the Ashburn Station there is 169,099 square feet of office with a 46.6% vacancy rate, leaving 78,777 square feet of vacant office.³⁰ CoStar's office pipeline for Ashburn Station indicates an additional 600,000 square feet of office, as part of Loudoun Station, which will likely be delayed until the general office market improves. Pipeline development at Loudoun Station also includes a 200+ room full-service hotel with a conference center. Multi-family development around Ashburn Station is performing well with a low vacancy of 1.1% among the current 651 units and rents have increased from a starting rent of \$1,450 to their current average asking rent of \$1,550 since opening.³¹ Current pipeline reports for multi-family development at the Ashburn Station indicate Comstock Development will develop additional residential units to reach its allotted 1,500 residential units under the current zoning.³² Retail at Loudoun Station is experiencing positive trends with a declining vacancy rate moving from 25% in 2013 to its current vacancy rate of 7.9%. As retail vacancy has decreased, retail rents have begun to rise and are currently \$36.81/ square foot. While Ashburn Station has a higher retail and office vacancy rate than the averages seen in Loudoun County the discrepancy may be due to the recent delivery of office and retail space which

²⁸ CoStar Loudoun County Market Analytics. Office Overview.

²⁹ CoStar Loudoun County Market Analytics. Office Overview.

³⁰ CoStar Loudoun County Market Analytics. Office Overview.

³¹ CoStar Loudoun County Market Analytics . Multi-Family Overview.

³² Stancik, Mike. "Loudoun Station Moves Into 'Phase Two' After Flurry of Activity." *Loudoun Business*. March 26, 2015.

has not yet been absorbed. As the arrival of Metrorail moves closer, office and retail uses at the Ashburn Station will perform better than office and retail which are not transit accessible.

The growing preference for mixed-use walkable developments has led to the proliferation of “Town Center” lifestyle destinations, which are heavy on retail, entertainment and residential uses in eastern Loudoun County. Given the weak office market conditions, sometimes residential, retail, and entertainment components are built first and office is added later.

- **One Loudoun** with three million square feet of Class A Office, 1,040 single-family homes, townhomes and multifamily homes, along with more than 700,000 square feet of retail, restaurant and entertainment uses.
- **Kincora Center** at full build out the 424 acre development will have more than 4 million square feet of class A office, 1,400 residential units, 720 hotel rooms, and 500,000 square feet of retail space.^{33 34}
- **Dulles Town Center** is a 554 acre master-planned mixed-use community with a blend of office, retail, and hospitality. The site currently contains the 1.4 million square foot Dulles Town Center Mall, three residential developments (Windmill Parc Apartments, Parc Dulles Apartment Homes, and Remington Apartments) a Marriot hotel and office space. A rezoning application in 2011 approved by the Board of Supervisors and Planning Commission would allow 5.4 million square feet of non-residential uses and 1,230 multi-family dwelling units at Dulles Town Center.³⁵ Current construction at Dulles Town Center includes Nokes Plaza, which will add 56,000 square feet of medical, office, and neighborhood serving retail to the site.³⁶

For additional information on the current conditions around the station areas, please refer to the Existing Conditions Report in Section One.

OFFICE MARKETS

The office market in Loudoun County is characterized by mid- density office along the Route 28 and Route 7 corridors and by large corporate campuses for tech and IT companies. As of Q1 2015, Loudoun County had 17.8 million square feet of office space, of which 10% of the total office space, 1.8 million square feet of office, was located within a half-mile of the Route 28 corridor. As a key north-south corridor through the County, with easy access to Dulles Airport, Loudoun County has encouraged the development of an office employment corridor along Route 28 and limited residential development and encouraged office serving retail. The remaining office buildings can be found countywide, and many are characterized as larger, corporate office campuses which were built for the specific needs of one user. For instance, Raytheon, a defense contractor, leased 600,000 square feet in the former AOL headquarter campus in 2009, and spent an additional \$37 million retrofitting the building and investing in security on site.³⁷ Even with extensive upgrades and spending on retrofits to the building, effective rents for Raytheon were comparable to competitive sub markets.³⁸ While landing Raytheon as a tenant in Loudoun County was a great benefit to the local economy, large relocations of corporations are not common occurrences, and the county's stock of aging suburban office parks and corporate campuses may struggle to find new tenants as

³³ KLN Retail. "Properties" Kincora Center. Accessed June 18, 2015.

³⁴ Kincora, "About Us" Accessed at: <http://www.kincora-va.com/>.

³⁵ Loudoun County, "ZMAP 2007-0001 & SPEX 2008-0048; Dulles Town Center." Board of Supervisors Action Item. July 19, 2011.

³⁶ Neibauer, Michael. "Lerner adding to Dulles Town Center with Nokes Plaza." *Washington Business Journal*. Feb 18, 2014.

³⁷ Burr, Andrew. "Raytheon, AOL Pull Trigger on 600,000-SF Lease in Virginia." *CoStar News*, Apr 2, 2009.

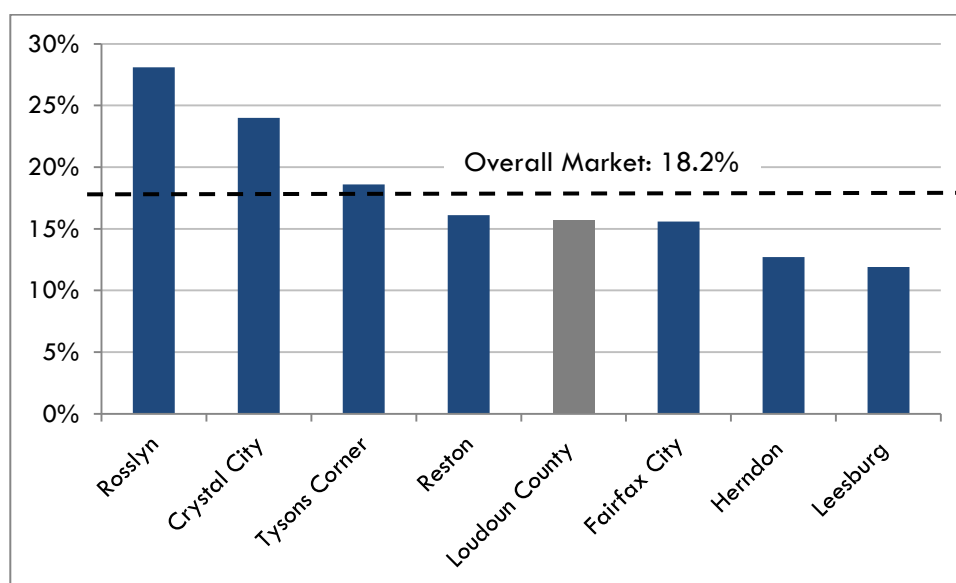
³⁸ Burr, Andrew. "Raytheon, AOL Pull Trigger on 600,000-SF Lease in Virginia." *CoStar News*, Apr 2, 2009.

current leases expire. Loudoun County is also home to several newer office developments which are also vacant and looking for new tenants.

The federal government sequestration has negatively impacted regional office markets. The contraction in the federal contracting industry has increased office vacancy as a result of reduced employment and has hit suburban markets particularly hard. In areas such as Crystal City, this comes on top of an already soft market as a result of the 2005 BRAC and the GSA downsizing space requirements for employees from 250 square feet in the early 2000s to a current utilization of 190 square feet or less.³⁹ Shrinking GSA office space follows a national trend of office densification. Using a national average, workers had 185 square feet/worker in 2012, down 35% from 250 square feet/worker in 2002.⁴⁰

With continued pressure to reduce office occupancy from federal and private users, the office vacancy rate in Northern Virginia reached 18.2% in the first quarter of 2015, an increase of 0.7 percentage points over the previous quarter. This is also an historic high for regional vacancy which has steadily increased from a low of 8% in 2006, to its current high of 18.2%.⁴¹ Loudoun County's office vacancy rate of 15.7% in the first quarter of 2015⁴² indicates that its market is doing slightly better than Northern Virginia overall.

Figure 2-9: Overall Vacancy Rate for Select Northern Virginia Submarkets (Q1 2015)



Source: CBRE Research, "Northern Virginia Office, Q1 2015" & CoStar Loudoun County Market Analytics

In 2015 Q2, the asking rent for all office buildings in Loudoun County had seen modest improvement to an average of \$24/square foot for full service rent, including taxes, insurance and maintenance, over the lowest asking rent of \$23.26 in 2013 Q1. However, office market rents in Loudoun County have yet to

³⁹ GSA Office of Governmentwide Policy. "Workspace Utilization and Allocation Benchmark." July 2011. Accessed at: http://www.gsa.gov/graphics/ogp/Workspace_Utilization_Benchmark_July_2012.pdf

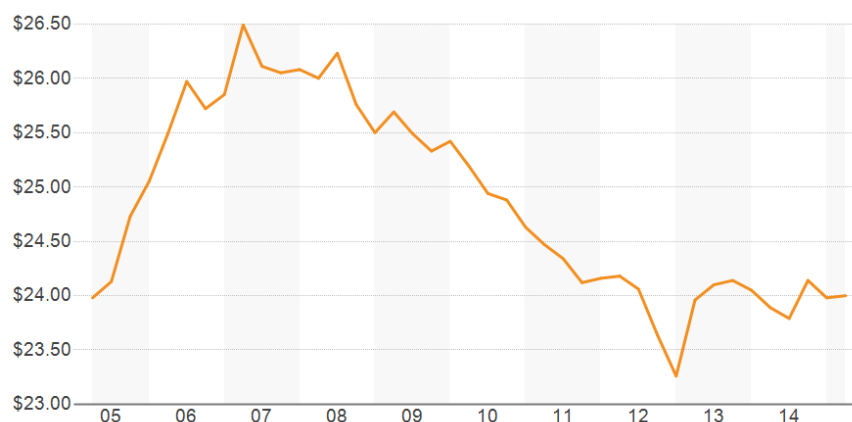
⁴⁰ Heschmeyer, Mark. "Changing Office Trends Hold Major Implications for Future Office Demand." CoStar News, Mar 13, 2013. Accessed at: <http://www.costar.com/News/Article/Changing-Office-Trends-Hold-Major-Implications-for-Future-Office-Demand/146580>

⁴¹ CBRE Marketview, Northern Virginia Office, Q1 2015.

⁴² Transwestern Real Estate Outlook, Loudoun County Office Submarket Report, Q1 2015.

return to their pre-recession highs of \$26.49/square foot, seen in 2007 Q2, right before the beginning of the Great Recession. Net absorption of office space in Loudoun County has improved from a low of negative net absorption of 93,000 square feet in 2013 to a positive net absorption of 222,000 square feet of office in 2014, and 168,000 square feet of positive office absorption to-date in 2015. As vacant office space is slowly absorbed and reduces the current oversupply of office space, office rents will begin to stabilize and may begin to increase for class A and class B office space in Loudoun County.

Figure 2-10: Loudoun County Office Gross Asking Rent PSF, 2005–2015



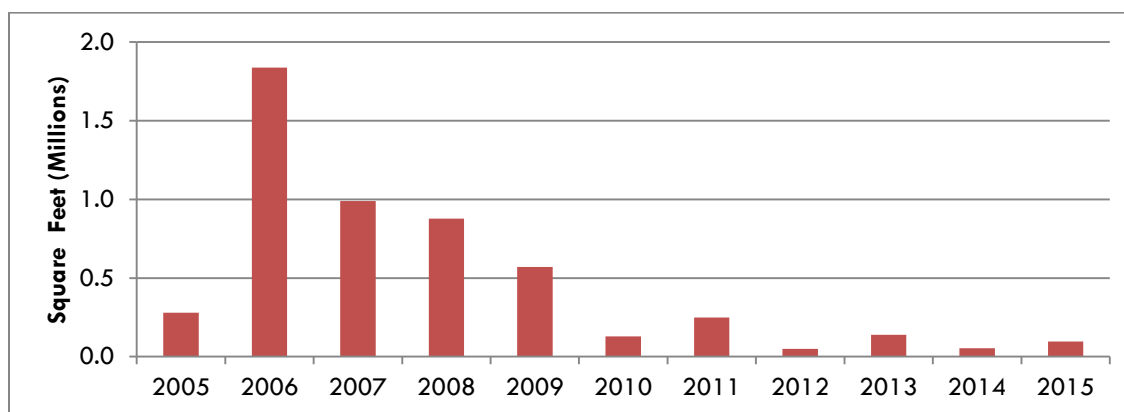
Source: CoStar Loudoun County Market Analytics

Recent construction activity has been concentrated in upgrades and improvements to class B and C office buildings to keep buildings competitive and retain existing tenants. The tenant-favored market results in a “flight to quality” trend as many companies are choosing to either upgrade their current office space by moving to a higher building class or requesting stronger concession packages, such as increased tenant improvement allowances or reduced rents, to remain in their current locations.⁴³ Most large office deliveries have been pre-leased or build-to-suit spaces for tenants, with limited new office deliveries in Loudoun County. It is unlikely that the regional office market will see much speculative office development until the market begins to improve with increased private sector and government demand for office.⁴⁴ The most likely places for limited speculative demand would be parcels in the Station Areas. According to developer interviews, office users looking for space at the Station Areas are likely to be office tenants of suburban, auto-dependent locations who are seeking office space which is closer to regional transportation options and in a more urban setting. Given the growing preference for transit-oriented development, the Station Areas offer locations that are more competitive than non-transit accessible suburban locations in Loudoun County. However, any speculative office at the Loudoun Gateway and Ashburn stations would also compete with existing office supply at other Silver Line stops, such as Tysons Corner, Reston Town Center, and Herndon.

⁴³ Cushman & Wakefield, “Marketbeat Office Snapshot, Northern Virginia Q4 2014.”

⁴⁴ Ibid.

Figure 2-11: Loudoun County Office Deliveries, 2005–2015



Source: CoStar Loudoun County Market Analytics

Please see the Appendix for more detailed information of office deliveries from 2006 – 2015.

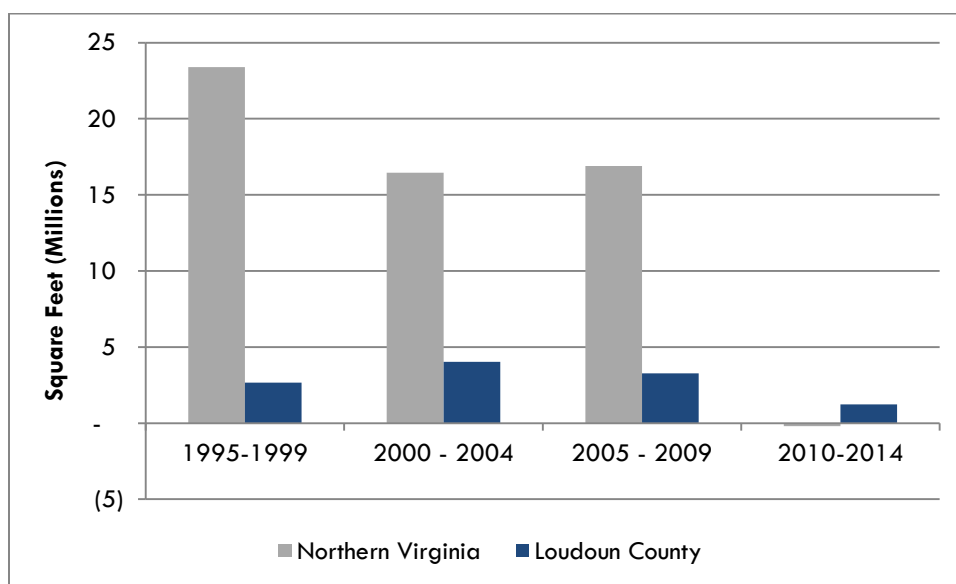
Outlook for Office Development near Loudoun's Station Areas: The Station Areas will be competitive office locations, but developers and tenants are hesitant to invest until the forecasted 2020 station opening date is certain. Loudoun County will be well-positioned to capture the growing preference for office space in walkable communities through transit-oriented development at the Ashburn and Loudoun Gateway stations. New office development at Loudoun Gateway aligns with the County's Transit-Related Employment Center (TREC) planned land use and Ashburn Station's mapped Transit Related Center (TRC) land uses which promote a similar, high-density and walkable development typology. Even with the County's support for office use, the development of offices faces several short-term challenges:

- **Silver Line Timing:** Investment in office product is unlikely to occur without a clear opening date for the Metrorail stations, and some investors, developers and tenants may be hesitant to invest until the stations have been operating for a while.
- **High Cost of New Construction:** Developers noted that they can currently get more value from renovating existing office buildings than building new ones in suburban locations. Due to depressed office rents and low vacancy rates, it is more affordable to renovate existing office with low occupancy rates and low income generation than to expand the capital outlay for a new office building. Since the development of a new office building would require additional developer costs including land, site preparation, infrastructures, and new building costs along with the risk of the building remaining empty due to the current oversupply.
- **Anchor Tenants:** With the current overbuild of office in the region there is more office space than tenants seeking competitive space. As the ratio of built office to demand from office users remains high in the foreseeable future, new office construction will have to compete among a limited pool of tenants seeking office space. New office development will likely require an anchor tenant to pre-sign a lease before construction occurs, and developers will likely need to compete on pricing and amenities with existing regional office stock as well as new development sites near other Metrorail stations in the region.
- **Route 28 Competition:** Route 28 is a key employment center for office, research and development, and retail to support office workers. The County's concentration of office and retail uses in Route 28 could potentially compete with new office and retail uses at the two station areas. Currently the Route 28 corridor has 1.8 million square feet of office, with another 5.3 million square feet of office development in the pipeline.

Projection of Future Office Market Absorption: The HR&A Team estimated the potential future office absorption for Loudoun County and the share of office absorption which may be captured in the two Station Areas. Each of the Station Areas has planned or proposed commercial office development as discussed in Section 1, which if completed would roughly double Loudoun County's existing 17 million square feet of office stock. Further, with the expected arrival of the Silver Line Metrorail to the County by 2020, both the County overall, and the Station Areas within the County, will be more competitive in attracting future office leasing activity.

In order to estimate absorption, the HR&A Team began by analyzing historic trends in net office absorption using CoStar data from 1995 through 2014 for the Northern Virginia office market overall (including the City of Alexandria, Arlington County, Fairfax County, Loudoun County, and Prince William County) and within Loudoun County itself. Figure 2-12: Historic Net Office Absorption, 1995 - 2014 displays the net office absorption in Northern Virginia and Loudoun County in five year increments from 1995 through 2014.

Figure 2-12: Historic Net Office Absorption, 1995 - 2014

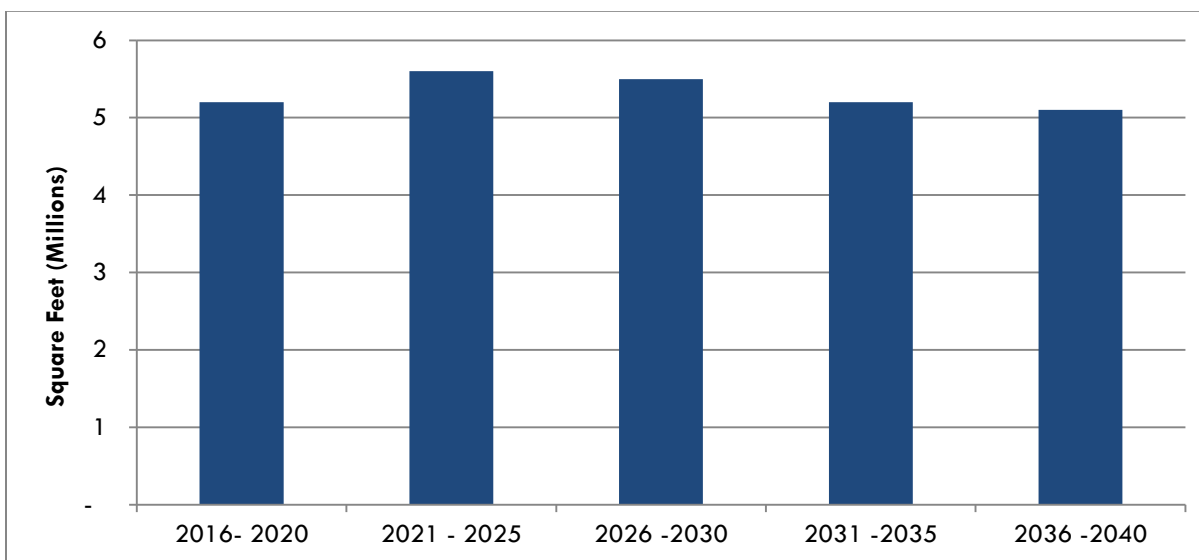


(Source: CoStar Market Analytics)

As these data show, both market areas had significant positive net absorption in the late 1990s and 2000s but have experienced sluggishness in 2010s. The HR&A Team's future forecast for the next 25 years, 2016 through 2040, assumes that as a baseline, Northern Virginia's net leasing activity will revert to an average of the 1995 to 2014 period moving forward. Loudoun County's share of overall Northern Virginia absorption has been on an upward trend, representing an average 27% over the previous 15 year period. The HR&A Team estimates that Loudoun County's competitiveness within the region will improve over the next 25 years, due to the County's attractiveness as a place to live and work, its capacity to deliver new class A office product, and the enhanced transit connectivity that Metrorail will bring to the County; we therefore assume that in the future Loudoun County's capture of net absorption will increase from 27% to 30% over the next five years and 35% thereafter reflecting an additional bump from Metrorail service.

The HR&A Team further adjusted Loudoun County's future absorption potential based on forecasted employment growth in the County provided by the Metropolitan Washington Council of Governments (MWCOG), which estimates County employment will increase from 163,000 in 2015 to some 278,000 jobs by 2040.⁴⁵ To translate this employment growth into additional office absorption, the Team assumed that 40% of the new jobs will be office based, that each new office job would take up 200 SF, and that 50% of the new square footage would represent additional absorption above the baseline absorption already included in the County's capture rate described above. The results of the HR&A Team's estimated absorption potential for Loudoun County are in Figure 2-13: Estimated Office Absorption for Loudoun County, 2016 - 2040.

Figure 2-13: Estimated Office Absorption for Loudoun County, 2016 - 2040

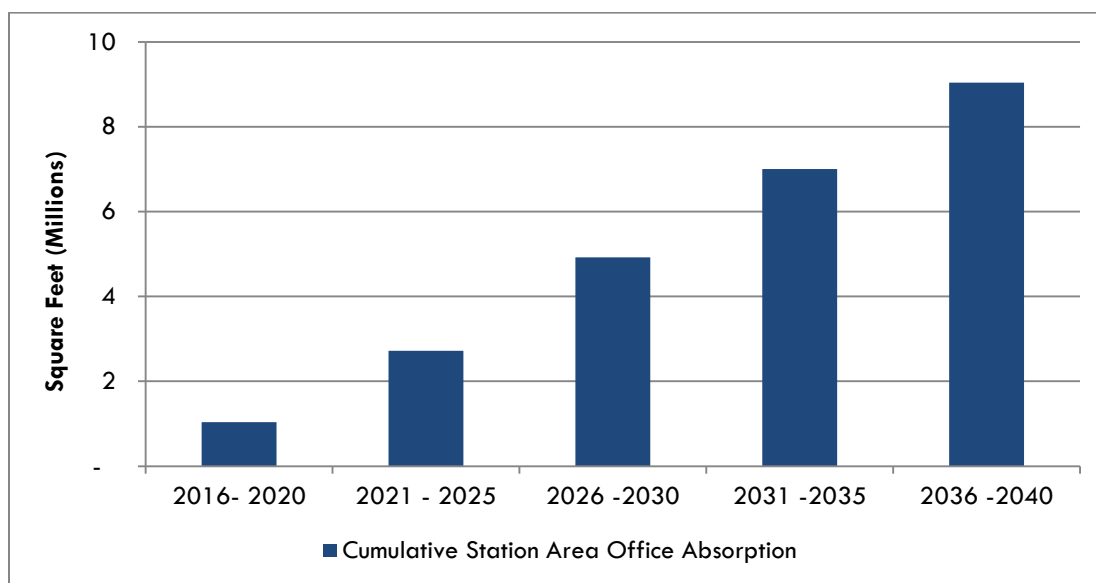


(Source: MWCOG Round 8.3 Cooperative Forecasts, CoStar Market Analytics, HR&A Analysis)

Finally, the HR&A Team estimated the share of Loudoun County's office absorption activity that could be captured by the two Station Areas. The Team estimated that in the next five years, the capture rate would be a relatively modest 20%, as based on our research of other Metrorail stations, discussions with local developers, and the current lack of certainty of an opening date is a hindrance to attracting new tenants, particularly anchor tenants that would be required for build-to-suit office space. Following Metrorail's opening, the Team estimates that the Station Areas will become the most competitive locations for new and existing tenants in the County and will achieve capture rates of 30% to 40% of the County's new absorption activities from 2021 through 2040. Figure 2-14: Estimated Office Absorption for Loudoun County Station Areas, 2016 - 2040 shows that the Station Areas in Loudoun County will capture a cumulative of approximately 9 million square feet of net office absorption over the next 25 years.

⁴⁵ Metropolitan Washington Council of Governments, "Round 8.3 Cooperative Forecasting: Employment, Population, and Households." Accessed August 2015.

Figure 2-14: Estimated Office Absorption for Loudoun County Station Areas, 2016 - 2040



(Source: MWCOG Round 8.3 Cooperative Forecasts, CoStar Market Analytics, HR&A Analysis)

RETAIL MARKETS

The retail market in the Washington Metropolitan Area has begun to see an improvement after a decline in consumer spending during the Great Recession. While vacancy rates in neighborhood and community center retail remain higher than their pre-recession rates of under three percent, overall retail vacancy rates in Northern Virginia have been declining from a peak in 2012 and reached 5.6% in Q4 2014.⁴⁶ Retail performance in Loudoun County is exhibiting a similarly strong performance with declining retail vacancy rates from a high of 6.5% in 2012 to a current low of 4.8%.⁴⁷ Simultaneously, rents per square foot in Loudoun County have been slowly increasing from a low of less than \$25/square foot to their current rate of \$28.02/square foot.⁴⁸ However, a steady pipeline of proposed retail development, including 484,000 square feet at the Kincora Center, 700,000 square feet at One Loudoun, and 1.4 million square feet at the Dulles Town Center will bring additional spaces to the market, thereby increasing the supply of space and decreasing upward pressure on rents.

Forecasts provided by the Fiscal Impact Committee for the Loudoun County Board of Supervisors anticipate that demand for retail will continue to grow with new households and higher employment rates. The 2013 Fiscal Impact Committee Guidelines estimated additional retail development from 2016 - 2040 will add 8.9 million square feet of retail space in Loudoun County,⁴⁹ increasing total square footage by 48% above the County's current 17.1 million square feet of retail.⁵⁰ Even though retail development aligns with the County's planned and mapped land uses at the Loudoun Gateway and Ashburn stations, stakeholder interviews revealed that property owners around the Loudoun Gateway and Ashburn stations were having difficulty attracting retailers to their sites due to low resident populations around the station areas and a

⁴⁶ Delta Associates, "Year-End 2014 Washington, DC Metro Retail Outlook."

⁴⁷ CoStar Loudoun County Market Analytics, Retail Overview.

⁴⁸ Ibid.

⁴⁹ Loudoun County Board of Supervisors Fiscal Impact Committee. "2013 Fiscal Impact Committee Guidelines: Demographic, Economic, and Fiscal Assumptions and Forecasts Draft." February 2014.

⁵⁰ CoStar Loudoun County Market Analytics, Retail Square Footage.

lack of daytime activity. As the arrival of Metrorail becomes more certain, it is likely that development density will increase, bringing additional residents, workers, and activity to the stations, making the sites more appealing to retailers.

Regional Competitors: New destination retail at the Station Areas in Loudoun County will have to compete by differentiating itself from existing retail destinations in Loudoun County and Fairfax County.

- **Tysons Corner** in nearby Fairfax County and along Metrorail's Silver Line has over six million square feet of retail, most of it in the two malls, Tysons Corner Center and Tysons Galleria. The malls at Tysons are about 17 miles east of the Station Areas and accessible to shoppers in Loudoun County by taking the Dulles Access Road east. Tysons Corner Center has more than 2.4 million square feet of retail, with over 300 retailers and is the tenth largest mall in the United States.⁵¹ The mix of high-end retail at Tysons Corner, along with easy access along the Beltway has created a regional shopping destination. The addition of Metrorail access to Tysons Corner has also improved the ease by which shoppers can reach the malls.
- **Leesburg Corner Premium Outlets** in Loudoun County include 494,000⁵² square feet of space and 110 designer and brand name outlet stores. The Leesburg outlets attract regional shoppers and global shoppers from Dulles Airport. Located roughly 10 miles northwest of the station areas, the outlets can be accessed via the Dulles Greenway from Loudoun Gateway and Ashburn Stations in about 15 minutes by car. Located 23 miles outside the Beltway's Outer loop, shoppers going to Leesburg must have vehicular access. The next closest outlet mall is 47 miles away in Hagerstown, MD, followed closely by the Tanger Outlets at National Harbor, 49 miles away.
- **Dulles Town Center**, a few minutes north of the Loudoun Gateway and Ashburn stations Dulles Town Center is a 554 acre master planned development by Lerner development which has built a live, work, and play environment with retail, restaurants, residential, hotel, office and medical in one development. Dulles Town Center is anchored by the Dulles Town Center Mall with 1.4 million square feet of retail with 185 retail shops and restaurants.⁵³ Plans for the continued expansion of Dulles Town Center include a 2011 rezoning application for more than 5 million square feet of non-residential uses, and 1,230 multi-family units. Current development at Dulles Town Center includes Nokes Plaza, 56,000 square feet of retail, office and medical uses.
- **One Loudoun**, advertised as Loudoun County's "new downtown", is planned for over 700,000 square feet of retail and entertainment, up to 3 million square feet of office, and over 1,000 housing units, and a hotel and conference center in Ashburn. Specific retail and entertainment tenants include Alamo Drafthouse - a multi-screen movie theater, a range of small shops, and restaurants. There were plans for a ballpark that are currently on hold due to a dispute with the developer of that component. One Loudoun is almost directly north of the Loudoun Gateway station and about five miles away from both of the Silver Line Stations. Using local roads, it would take 10 – 15 minutes to reach One Loudoun from the station areas.
- **Retail Community Centers**, such as Dulles Town Crossing, Dulles 28 Shopping Center, and Potomac Run Plaza each contain thousands of square feet of big-box retail along with a number of convenience retail destinations such as banks and pharmacies, along with fast-food chains.

⁵¹ Fairfax County Economic Development Authority. "Tysons Corner Business Area." Accessed May 11, 2015 at: <http://www.fairfaxcountyped.org/tysons-corner-business-area>

⁵² Loudoun County. "Completed Retail Centers – Loudoun County." Accessed May 11, 2105 at: <http://va-loudouncounty.civicplus.com/DocumentCenter/View/57085>.

⁵³ Dulles Town Center. "News & Press Releases – About Dulles Town Center." Accessed May 11, 2015 at: <http://www.shopdulles-towncenter.com/pressrelease/2015-01-28-lerner-windmill-parc-at-dulles-town-center-welcomes-its-first-residents/2130563606>.

These existing community centers offer a range of convenience-oriented retail and general merchandise that is easily accessible for shoppers. Retail Community Centers have strategically clustered along the highly trafficked Route 28 and Route 7 to appeal to a high number of daily drivers and capture local retail spending. New retail at the Station Areas will likely develop as lifestyle retail, which focuses on dining and entertainment uses and will not compete with the unique convenience shopping experience of the community centers.

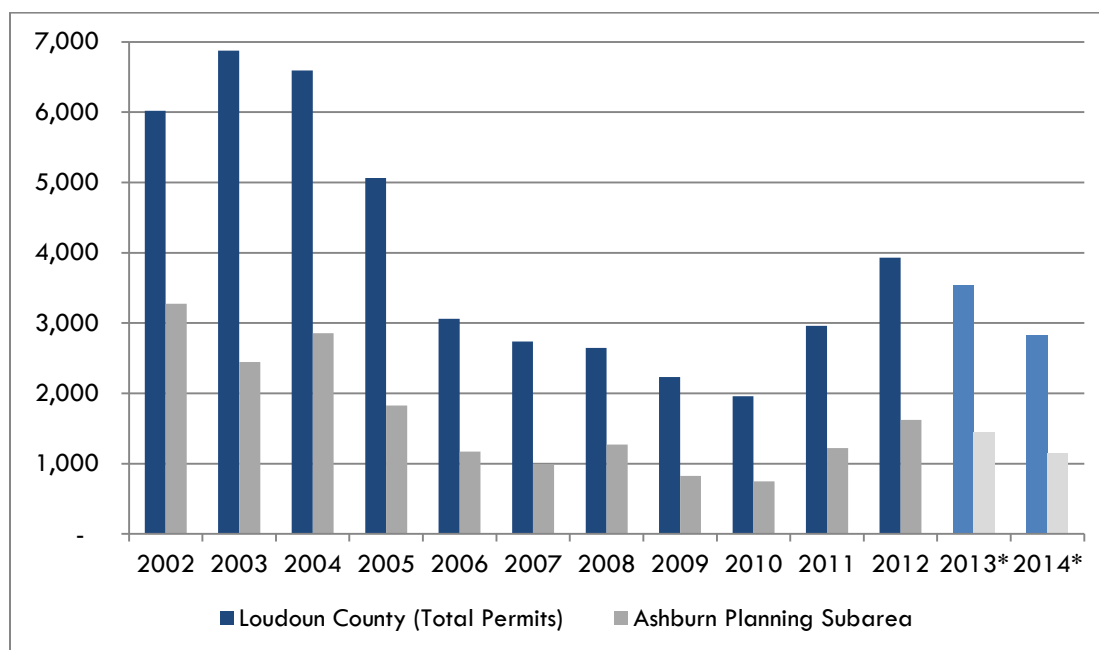
Outlook for Retail Development near Loudoun's Station Areas: Even with strong regional competition, the Station Areas' strategic location along the Silver Line and Dulles Greenway provide highly accessible and visible locations capable of attracting a large customer base. Locational benefits for retail at the Station Areas, in a more active and urban environment, should enable retail spaces to achieve higher occupancy rates and above market rents for space. Locally-serving retail will likely develop alongside residential and commercial development at the Ashburn Station. Without a customer base, locally-serving retail may take longer to develop at the Loudoun Gateway Station as residential development is currently prohibited and the proposed office development may take a while to emerge. However, adding an entertainment component to retail development, such as live theater and performances, could further enhance the retail experience at both of the station areas and create a unique regional destination that could attract shoppers from Dulles Airport and adjacent counties, and Loudoun County residents who previously shopped elsewhere. And a unique entertainment and retail destination could also lead development at the Loudoun Gateway Station as an independent anchor until market conditions improve to support the development of office which could further support the retail and entertainment uses at the station.

RESIDENTIAL MARKETS

The housing market in Loudoun County appears to be recovering from a period of low building activity from 2006 to 2010 and the County is experiencing an increase in the supply of residential units. From a low of 1,958 permits in 2010, annual building permits in Loudoun County have since been above 2,500 annual permits, including single family and multi-family construction. While a definitive upward trend has yet to emerge, a tentative upward trend suggests the numbers of annual building permits are slowly increasing from a low in 2010. Increasing numbers of building permits indicate the housing market in the County may be recovering from a temporary slowdown in residential construction. Looking forward, an improving regional economy, estimated population growth, and trends of increased housing permits suggest that demand for additional housing in Loudoun County will continue. An historical analysis of housing permits from 2002 – 2012 indicates the Ashburn Planning Subarea averaged 41% of all building permits, which aligns with the County's Suburban Policy Area plan to concentrate residential development on the eastern side of the County.⁵⁴

⁵⁴ Loudoun County Department of Planning and Zoning. "Loudoun County Planning Subarea Estimates 2000 to 2015." Apr 22, 2015.

Figure 2-15: Total Residential Building Permits Issued, 2002 - 2014



Source: 2013 Fiscal Impact Committee Guidelines: Demographic, Economic, and Fiscal Assumptions and Forecasts & *U.S. Census Bureau County Building Permits Survey

According to local stakeholders, private development in Loudoun County has yet to deliver new residential development at the full higher densities allowed in the County's zoning code. The discrepancy between permitted density and developed density may be due to a perceived lack of interest in the market for higher density units due to the market characterization as a single-family market or a lack of developer familiarity with denser housing development. Local developer interviews also indicated a preference to construct lower density developments in order to obtain approvals from the Board of Supervisors. Current development trends in Loudoun County have favored the development townhouses and single-family units. Of the new residential units in 2013, 52% were townhouses (single-family attached), 36% were single-family detached and 12% were multifamily.⁵⁵

Under current County Land Use Policies and zoning, residential development is permitted at the Ashburn Station but prohibited at the Loudoun Gateway Station due to the Airport Impact Overlay District and current TREC, Keynote Employment and Route 28 Business Designations.

Loudoun County's for sale residential market outperformed the Metropolitan Washington residential market in 2014 with higher than average home prices. Currently, the residential for-sale market in Loudoun County is stronger than the for-sale residential market in the Washington Metropolitan Area overall. The December 2014 Median Sales price in Loudoun County for all units was \$425,000, which is four percent higher than the Washington Metropolitan Area average of \$408,000.⁵⁶

⁵⁵ Loudoun County Board of Supervisors Fiscal Impact Committee. "2013 Fiscal Impact Committee Guidelines: Demographic, Economic, and Fiscal Assumptions and Forecasts Draft." February 2014.

⁵⁶ George Mason University CRA and RealEstate Business Intelligence. "Washington, D.C. Metro Area – December 2014 Housing Market Update." January, 2015.

- **Strong Single-Family Home Sales:** The median sales prices for detached single-family homes are increasing in Loudoun County, and rose by 5.7% between January 2014 and January 2015 to reach a median sales price of \$550,000.
- **Challenging Condo Market:** Condos in Loudoun County saw a decrease of 6.5% in median sales price between January 2014 and January 2015 to an average of \$250,000. While the median sales price for condo products has declined, a low supply of total condo products, 2.8 months of supply based on average sales price, indicates a sellers' market that is favorable for new development with a greater demand than supply of condos. In fact the active condo supply has begun to increase; indicating new products are entering the market in response to this demand.

While rental housing is a small component of Loudoun County's total housing market, demand for additional rental products in Loudoun County and a limited supply has caused the average monthly rent to steadily increase. From 2000 - 2013 rental housing in Loudoun County constituted 22% of the total housing stock which is 14 percentage points lower than the Washington MSA's percent of 36% of the housing units. The relative undersupply of rental housing in Loudoun County compared to the region was echoed during stakeholder interviews which indicated demand in the County for additional rental housing product, especially for younger professionals and couples in the County. Increasing monthly rents in Loudoun County are an additional indicator of demand for more product, from 2000 to 2013 the average monthly rent increased by 73% going from \$954 to \$1,654 dollars per month.⁵⁷ In addition, rental units in Loudoun County are 15% more expensive than the average monthly rent per unit in the Washington, MSA with average rents of \$1,654 per unit, per month compared to the MSA's average rent of \$1,439 per unit, per month.⁵⁸

Outlook for New Residential Development at Ashburn Station Area: Demand for new housing product, especially around the Ashburn Station can continue to absorb additional units of multi-family housing through 2020 with the arrival of Metrorail. Combined population growth, household growth, increased building permits, and low vacancy rates all suggest a growing housing market with continued demand for new product. Data on population and household growth in Loudoun County show the County's overall population grew at an average rate of 6% a year, going from 169,599 residents in 2000 to 327,605 residents in 2012.⁵⁹ During this time, the Ashburn Planning Subarea, which encompasses the Loudoun Gateway and Ashburn Stations, saw an even stronger rate of growth of 9% a year, going from 33,566 residents in 2000 to 94,388 residents in 2012.⁶⁰ From 2000 - 2012, the Ashburn Planning subarea captured about 29% of the County's annual population growth.⁶¹ With County forecasts of increased population growth through the arrival of Metrorail and beyond (Figure 2-2), Ashburn will likely continue to capture over a quarter of new resident growth until the subarea has been fully developed and reflects a more urban development pattern.

The current multi-family vacancy rate of 5% in Loudoun County and a multi-family vacancy rate of 1.1% in the Ashburn Station Area, immediately surrounding the proposed station stop, suggest market demand for

⁵⁷ U.S. Census Bureau, 2000 Census. "Profile of Selected Housing Characteristics." Accessed May 26, 2015.

⁵⁸ American Community Survey, U.S. Census Bureau. "Selected Housing Characteristics, 2009-2013 American Community Survey 5-Year Estimates." Accessed May 26, 2015.

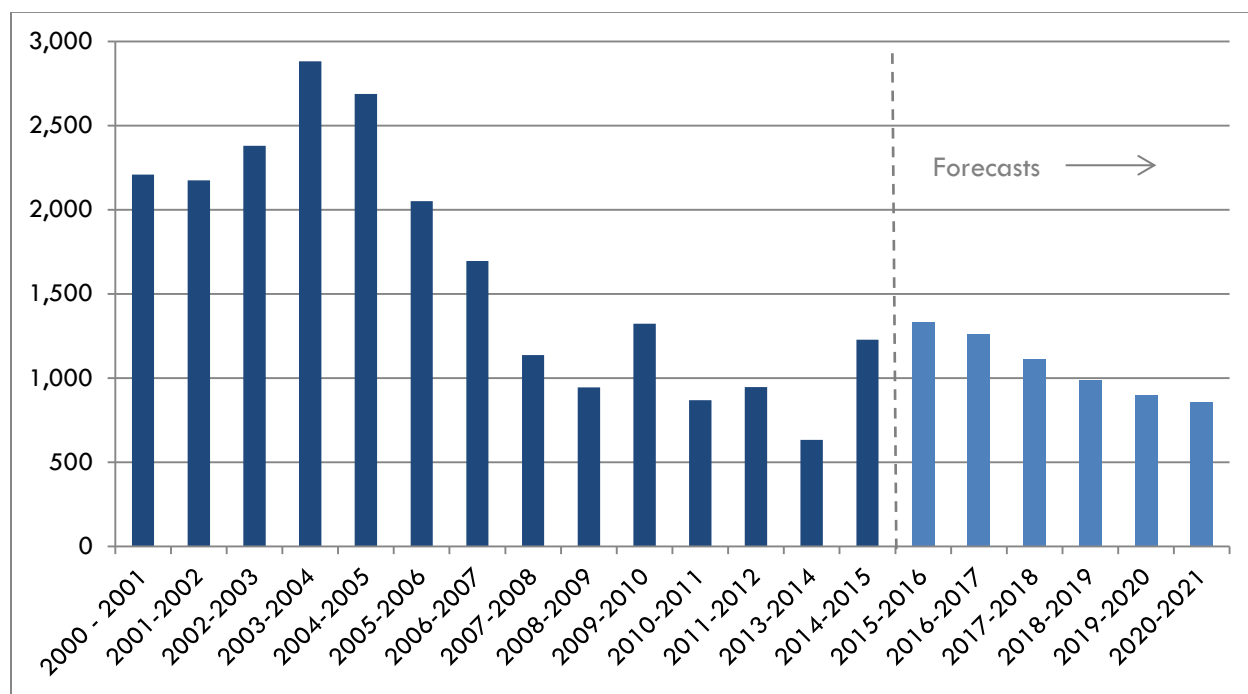
⁵⁹ Loudoun County Department of Planning and Zoning. "Loudoun County Planning Subarea Estimates 2000 to 2015." Apr 22, 2015.

⁶⁰ Loudoun County Department of Planning and Zoning. "Loudoun County Planning Subarea Estimates 2000 to 2015." Apr 22, 2015.

⁶¹ Loudoun County Department of Planning and Zoning. "Loudoun County Planning Subarea Estimates 2000 to 2015." Apr 22, 2015.

additional multi-family housing product.⁶² From 2015 - 2020 the larger Ashburn Planning Subarea is forecast to increase its number of housing units by 6,456 units, and a percentage of this new growth should be concentrated around the Ashburn Station to encourage higher-density transit-oriented development.⁶³ Concentrating even a quarter of new development around the Ashburn Station Area, could develop some 1,600 new multifamily units from 2015 - 2020 and could build upon the forecasted arrival of the Silver Line in 2020.

Figure 2-16: Household Growth and Forecasts in the Ashburn Planning Subarea



Source: Loudoun County Board of Supervisors Fiscal Impact Committee

Near-Term Absorption Potential: Competitive development nodes along the Silver Line such as Innovation Center and Reston Town Center have absorbed about 200 multi-family units a year, which may serve as a conservative benchmark for development in the Ashburn Station Area.⁶⁴ These absorption rates may be low when compared to Loudoun County, especially since these competitive nodes have not experienced a similar level of population growth seen in Loudoun County. Using comparable benchmarks, the Ashburn Station could absorb 200 units per year from 2015- 2020 creating demand for an additional 1,000 units to be absorbed. Currently, Comstock has plans to develop an additional 900 units within the Ashburn Station Area, leaving a market gap of 100 multi-family units in the Ashburn Station Area. However, as the regional market improves, absorption rates may increase, and the Ashburn Station Area may be able to absorb more than 200 units per year. With an eye towards improving market conditions, the County may consider allowing even more multi-family development to encourage construction of additional multi-family units at the Ashburn Station.

⁶² CoStar Loudoun County Market Analytics, Multi-Family Overview.

⁶³ Loudoun County Department of Planning and Zoning. "Loudoun County Planning Subarea Estimates 2000 to 2015." Apr 22, 2015.

⁶⁴ CoStar Market Analytics, Multi-Family Overview.

HOTEL MARKETS

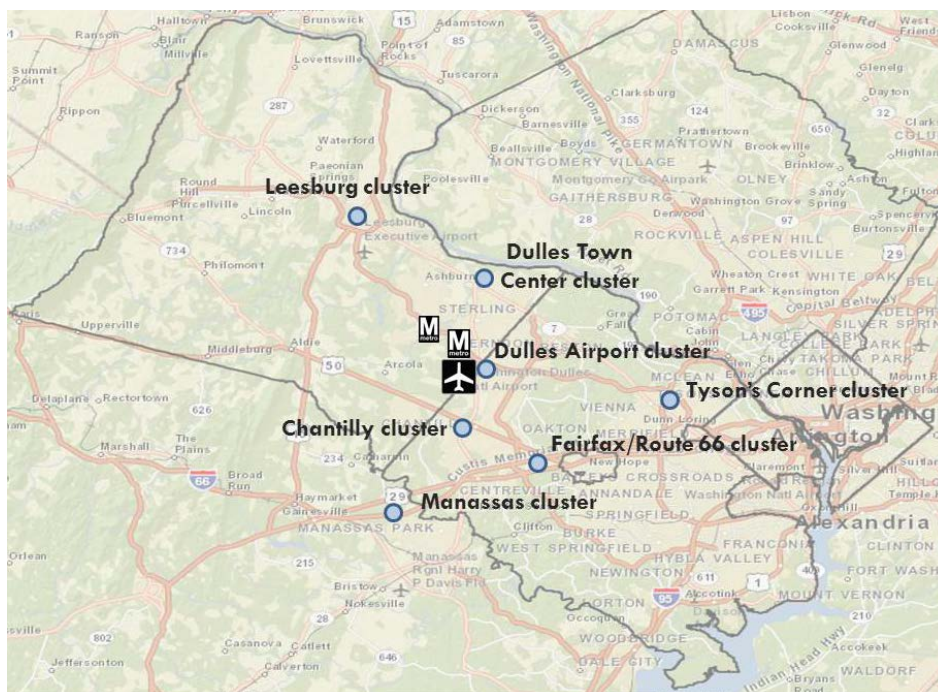
Currently, overnight visitors to Loudoun County are primarily business travelers with a small but growing leisure visitor market. In 2012, 74% of overnight visitors were business travel, with leisure travel the remaining 26% of overnight visitors.⁶⁵ Both overnight leisure travelers (322,380 leisure travelers) and business travelers (912,794 business travelers) had modest growth of 3% and 2.5% respectively over 2011 visitation numbers. Mid-Atlantic forecasts for the hospitality market indicate increased occupancy and operator revenue for 2015 as an improving economy supports increased business and leisure travel.⁶⁶ With average hotel occupancy of 63% between 2007 and 2012, increased business and leisure travel to Loudoun County should create demand for additional hotel rooms. As all but one of the existing hotels in Loudoun County are only accessible by car, a new hotel at the Loudoun Gateway or Ashburn Station that is Metrorail accessible could capture overnight hotel demand generated by Dulles Airport from flight crews and business travelers who need a convenient hotel during business travel.

There are currently no hotels located within a half mile of the proposed station areas. Existing hotels closest to the two station areas are clustered in close proximity to Dulles Airport and road connections to major employment centers along Route 28, Route 50, and the Dulles Access Road. While a new hotel will have to compete with the number of hotels in the current market, a scan of existing hotels close to the airport suggests most of them are older facilities and/or require overnight visitors to access the hotels by car or shuttle from the airport. The Dulles Airport Marriott, a 368 room hotel is the only lodging accommodation at the airport. New hotel development will also benefit from direct Metrorail accessibility which will enable visitors to quickly move from the Airport or the region to a hotel at the station areas. Currently many of the Silver Line Metrorail Stations, including the Ashburn Station, have plans for the development of a hotel adjacent to the proposed stations. Under the current County Land Use plans, the development of a hotel aligns with the planned TREC land use at the Loudoun Gateway Station and TRC land use at the Ashburn Station. Currently the development plans at Loudoun Station call for a full-service hotel with conference facilities.

⁶⁵ Visit Loudoun, "FY2014 Business Plan."

⁶⁶ Marcus & Millichap, "Mid-Atlantic 2015 Hotel Outlook."

Figure 2-17: Primary Hotel Clusters



Source: HR&A Analysis

INDUSTRIAL MARKETS

Data Centers and small Local Distribution Centers in Loudoun County are performing well and demand for additional space has encouraged speculative development of new light-industrial product. Loudoun County contains over 14 million square feet of industrial space, which is about 27% of the total industrial square footage of Northern Virginia.⁶⁷ With current industrial vacancy at 4.8%, local developers indicated there was a strong speculative market for industrial and flex industrial space to be used for data centers and local distribution uses in Loudoun County.⁶⁸ While industrial space for data centers and local distribution centers are not desirable for TOD development due to large footprints and relatively low worker density, the relatively simple construction of flex warehouse space for these uses could provide an interim use at the Station Areas until the office market improves in the region. Under current Land Use Policies some light industrial uses may be allowed at the Loudoun Gateway and Ashburn Station, but development approval should be weighed against the relative downside of allowing potentially large format development to occur in an area targeted for high-density development.

The limited regional manufacturing economy and Dulles Airport's location create limited demand for industrial manufacturing spaces and large storage warehouses for shipping. Loudoun County and the Washington Metropolitan Area are not part of a large manufacturing economy and there are limited exports which leave the region and would require export services at Dulles Airport. Airports with a strong cargo shipping component typically have strong connectivity to rail and roads. Dulles is 60 miles from the inland port at Front Royal and 14 miles from Interstate 95 on roads that are not conducive to truck traffic.

⁶⁷ CoStar Market Analysis, Industrial Space. Accessed May 16, 2015.

⁶⁸ CoStar Market Analysis, Industrial Space. Accessed May 16, 2015.

KEY CONCLUSIONS FROM REAL ESTATE MARKET CONDITIONS

- The auto-oriented office market in Northern Virginia and Loudoun County is likely to remain weak as the market continues to be influenced by office densification and ongoing federal sequestration.
- Transit-accessible office locations have maintained higher tenant occupancy and rents than non-transit-accessible office locations. As Metrorail arrives in Loudoun County, office buildings at the Station Areas will likely be better positioned to capture market demand than suburban office.
- New office development at the Station Areas will have to compete with existing office along the Silver Line and in Loudoun County, which alone, has over 17.8 million square feet of older office buildings which may make the construction of new office untenable under current market conditions.
- Continued population growth and high incomes have fueled a steady retail market in Northern Virginia with a low vacancy rate of 5.6%, and has supported new retail growth in the County, mainly-oriented around “town center” mixed use style developments, such as One Loudoun.
- With demand in Loudoun County for additional retail, the station areas will be attractive to two types of retail:
 - **Convenience retail** – small stores, markets, personal services, etc. The market for this retail will be station users and nearby residents, workers, and visitors, within a half to one mile trade area. This type of retail may compete with existing or new convenience retail in the trade area.
 - **Destination retail** – large stores, entertainment uses, restaurants, etc. The market for this retail will be regional residents and visitors; it will also be enhanced by the proximity to the Silver Line.
- The residential market in Loudoun County is stronger than the overall Washington Metropolitan Area as indicated by higher than average sales prices and rents.
- While Loudoun County has experienced steady population growth, the number of annual building permits issued by the County has declined and remained below historic highs, indicating a reduction in housing construction that may not meet housing demand driven by new residential growth.
- The hospitality industry in Loudoun is closely tied to business travel, with a majority of visitors citing business as their primary purpose of travel.
- Visitors to Loudoun County are seeking dining and shopping experiences in conjunction with their visits, and new hotels at the Station Areas which are located in an entertainment type destination with shopping and dining options may have a competitive advantage to existing hotels near Dulles Airport with limited evening activities.
- Retail and office within a half-mile of the Ashburn Station are performing below the market averages in Loudoun County. However, the lower occupancy rates at Ashburn Station may be due to the recent delivery of retail and office space which has had less time to be absorbed by the market. As the arrival of Metrorail comes closer, office and retail uses in the Ashburn Station will perform better than locations which are non-transit accessible.
- As the office market remains weak, developers will seek out alternative development opportunities which can be absorbed by the market. Since residential demand is steady in Loudoun County, many redevelopment proposals will likely contain new and additional residential uses.

V. COMPETITIVE POSITION AMONG REGIONAL TRANSIT/TRANSPORTATION CENTERS & ALONG THE SILVER LINE

COMPETITIVE POSITION WITHIN THE METRORAIL SYSTEM

The Washington Metrorail system has provided rail service in the region since 1976 with the opening of the first Metrorail stations along the Red Line in downtown Washington DC. Since then, Metrorail has expanded to include 91 stations along six lines with additional expansion planned for the Silver Line to Dulles Airport and Loudoun County. Metrorail access has increased the transit accessibility of residents, workers and visitors to the Washington Metropolitan Area, and increased property values on average, within a half-mile of a Metrorail station by 6.8% for residential properties, 9.4% for multi-family and 8.9% for commercial office properties.⁶⁹

HR&A conducted an analysis of stations across the Metrorail system to identify development trends at stations which may be applicable for development at the Loudoun Gateway and Ashburn Stations. In selecting stations for analysis, HR&A sought stations which matched a range of criteria.

- **Age of Station:** As Metrorail approaches 40 years of service, how has time impacted the rate and level of development at Metrorail stations? Are older stations more developed or does station location matter more?
- **Location:** Loudoun Gateway and Ashburn stations are end of line stations, which will serve a very different commuter profile than stations in the heart of DC. How have other end of line stations developed? Do they share characteristics and development patterns? Similarly, HR&A mainly focused on stations in exurban locations outside the Beltway.
- **Planning Process:** HR&A identified stations in Maryland, the District, and Virginia to review the planning process at various stations and commonalities across the planning process.
- **Mix of Development:** Is there a typical mix of development at Metrorail stations? Are stations adding more of certain uses over others?

After a high-level scan of the Metrorail system, HR&A selected eight stations, and one MARC Station that embodied potentially relevant development patterns. The chart, Figure 2-18: Development Patterns within a Half-Mile from Competitive Station Nodes, summarizes total development within a half-mile of the station-area, the mix of uses at each station, and additional amenities and public investments which have been made at each station.

⁶⁹ AECOM. "Making the Case for Transit: WMATA Regional Benefits of Transit." November 2011. Accessed at: <https://www.wmata.com/pdfs/planning/WMATA%20Making%20the%20Case%20for%20Transit%20Final%20Report%20Jan-2012.pdf>

Figure 2-18: Development Patterns within a Half-Mile from Competitive Station Nodes

| | Loudoun County | | Inside the Beltway | | | Outside the Beltway | | | | | |
|--|-----------------|-----------------|--|---|-----------------------|---------------------|---|---|---|-------------------------------------|------------------|
| | Loudoun Gateway | Ashburn Station | Ballston | Rosslyn | Van Dorn Street | Tysons Corner | Innovation Center | White Flint | Vienna/Fairfax - GMU | Wiehle-Reston East | BWI Rail Station |
| Metrorail Opening | 2020 | 2020 | 1979 | 1977 | 1991 | 2014 | 2020 | 1984 | 1986 | 2014 | 1980 |
| Commuter Parking (Spaces) | 2,750 | 3,000 | --- | --- | 361 | --- | 2,000 | 1,270 | 5,169 | 2,300 | 3,187 |
| Total Development 1/2 mi (SF) | 235 K | 2.0 M | 20 M | 16.3 M | 4.2 M | 14.2 M | 3.0 M | 10.3 M | 2.0 M | 5.2 M | 0 |
| Percentage of Development* (1/2 Mile) | | | | | | | | | | | |
| Office | 0% | 8% | 46% | 59% | 20% | 62% | 47% | 30% | 21% | 91% | 0% |
| Residential | 0% | 46% | 43% | 30% | 22% | 2% | 29% | 37% | 79% | 0% | 0% |
| Retail | 0% | 13% | 3% | 1% | 3% | 27% | 0% | 21% | 0% | 0% | 0% |
| Other | 100% | 33% | 8% | 10% | 54% | 9% | 24% | 11% | 0% | 9% | 0% |
| Additional Uses | | | | | | | | | | | |
| Educational Uses | | | Marymount University; George Washington University | | | | George Mason University Executive Programs | | Missouri State University Defense Studies | Northern Virginia Community College | |
| Research & Development | | | DARPA; Office of Naval Research; Virginia Tech Research Center | | | | Virginia Center for Innovative Technology; Northrop Grumman | National Institutes of Health | | Washington Post Office | |
| Cultural/Open Space Amenities | | | Kettler Ice Plex; Wellburn Square; Central Library | Dark Star Park; Hillside Park; Artisphere; Potomac Heritage Trail; Rosslyn Highlands Park; Arlington Gateway Park; Freedom Park Trail; US Marine Corps War Memorial | Armistead Boothe Park | | | White Flint Park; Wall Park; Kennedy Shriver Aquatic Center | East Blake Lane Park; Briarwood Park; Nottoway Park | | |

* Competitive market only. Excludes owner-occupied buildings

Key findings from the HR&A Team's analysis included:

- **Beltway Proximity:** Stations located inside the Beltway or closer to the Beltway have typically experienced more total development than stations located outside of the Beltway.
- **Station Age:** Older Metrorail stations have had more time to develop and gone through several real estate development cycles and reflect decades of development. The high-density and mix of uses reflect a real estate process which has taken several decades to achieve, and may not be feasible in a short period of time at other metro stations.
- **Parking:** Stations that have greater Metrorail-supplied commuter parking tend to have less development around the station. It is difficult to assess the relationship across the board, but this indicates that large parking facilities immediately adjacent to stations may be a barrier to other transit-oriented land uses, and that, where development has occurred around stations, the value of land for development exceeds the value of surface parking for commuters.
- **Mix of Uses:** While office is a high percentage of the existing development at station areas inside the Beltway,⁷⁰ residential uses are typically the second highest use found around the Metrorail stations. The mix of residents and daytime office workers supports a higher level of activity at the stations, including daytime hours, evenings, and weekends, which makes the location more desirable for retailers.
- **Cultural Amenities:** Stations inside the Beltway have a mix of public parks and amenities, such as trails, monuments, and libraries which improve the quality of life for residents and office workers.

Local governments and developers at several stations outside the Beltway are focused on diversifying the mix of uses and increasing development density around Metrorail stations to create a more vibrant destination and increase the economic value of the station areas. Redevelopment at the stations appears to follow several trends:

- **Auto-centric to Pedestrian Preferences:** Station Areas outside of the Beltway have a lower development density and follow a suburban development typology which favors the use of cars to access the stations. New development plans for White Flint in Montgomery County, Maryland as well as, Vienna, and Wiehle-Reston in Fairfax County, Virginia have approved increased density around the Station Areas to encourage a more walkable development typology to appeal to growing preference for urban lifestyle centers.
- **Strong Housing, Weak Office:** At Vienna and White Flint developers have been successful in providing higher density housing options, but have struggled to provide a mix of office and retail to accompany the residential uses. Much like Loudoun County, the weak regional office market has limited the development of office at other station areas which are unlikely to improve until overall vacancy in the region decreases.
- **Creating a Sense of Place:** During and after development at station areas, developers have focused on creating a unique sense of place and branding new development. Developers have created both a physical development and a lifestyle brand which will appeal to future residents and commercial tenants who want to live, work, and play in a new and unique environment. As renters and homeowners have more and more housing options, developments must provide curate a lifestyle and amenities to be competitive. For example, the Pike & Rose development near White Flint Metrorail Station created an active branding strategy, "So Happy Together" that connects residential development with adjacent retail and programming to create a unique

⁷⁰ Excludes Van Dorn Station which is characterized by a strong industrial presence.

experience for the community. New residential development is competing on amenities as well as on price.

Case Study: Vienna MetroWest Town Center



The Vienna Metrorail Station is the terminus of the Orange Line and surrounded by low-density, single-family homes. In 1996, the Fairfax County Board of Supervisors approved the development of MetroWest, a 56 acre high-density, mixed-use development of office, retail, and 2,250 residential units within walking distance of the Vienna Metrorail Station.⁷¹ Due to regional challenges in the real estate market, Clark

Construction returned to the County in 2013 with a development proposal that drastically reduced total development density. Citing a difficult office market, Clark Construction removed the proposed office buildings and proposed temporary single-story retail structures until office development became feasible.⁷² While MetroWest may take several years to achieve planned density, the residential offerings on site are leasing well and townhomes and condominiums have sold out.⁷³ Unable to achieve approvals for a development plan of lower density, and facing strong public opposition to changes to the plan ⁷⁴ Clark Construction has moved forward with the development of a residential tower on site with ground floor retail which will deliver in late 2016 or 2017. As of now, development of MetroWest is planned to achieve original plan density but there is no timeline for additional development on site.⁷⁵

⁷¹ Rein, Lisa. "MetroWest development is approved in Fairfax." *The Washington Post*. Mar 28.2006. Accessed at: <http://www.washingtonpost.com/wp-dyn/content/article/2006/03/27/AR2006032701624.html>

⁷² Malouff, Dan. "Fairfax still wants a real center at Vienna MetroWest." *Greater Greater Washington*. Jul 3, 2013. Accessed at: <http://greatergreaterwashington.org/post/19375/fairfax-still-wants-a-real-center-at-vienna-metrowest/>

⁷³ Crawford Chapoell, Carisa. "Style and affordability at Pulte Homes' MetroWest condos in Fairfax County." *The Washington Post*. Dec 19, 2014. Accessed at: http://www.washingtonpost.com/realestate/style-and-affordability-at-pulte-homes-metrowest-condos-in-fairfax-county/2014/12/18/45c5012c-7fc1-11e4-9f38-95a187e4c1f7_story.html

⁷⁴ Malouff, Dan. "Fairfax still wants a real center at Vienna MetroWest." *Greater Greater Washington*. Jul 3, 2013. Accessed at: <http://greatergreaterwashington.org/post/19375/fairfax-still-wants-a-real-center-at-vienna-metrowest/>

⁷⁵ Conversation with representative from Paraclete Realty, LLC, providing retail leasing services for MetroWest. June 19, 2014.

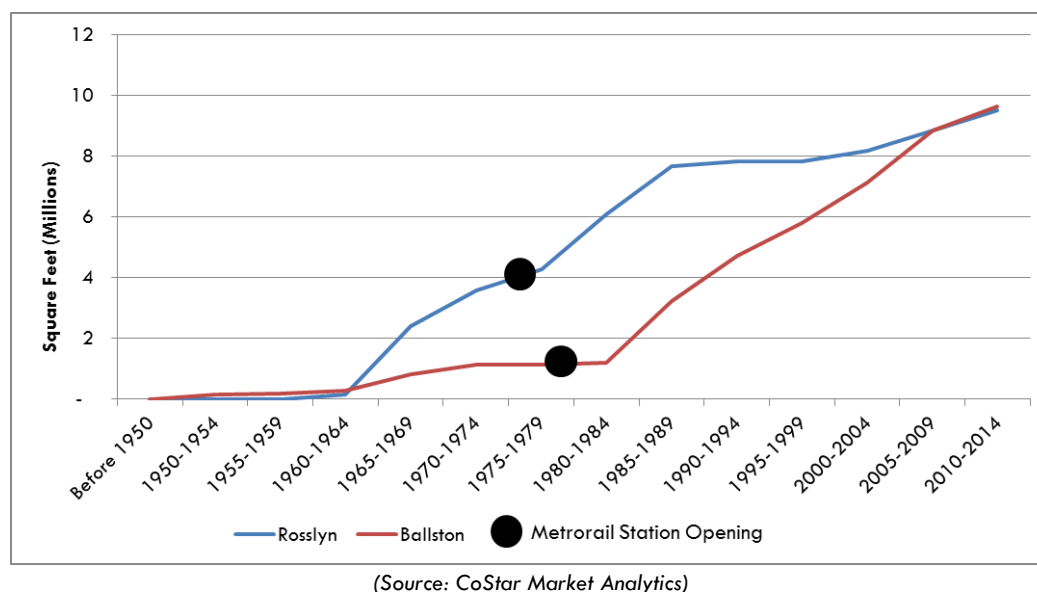
CONCLUSIONS AND IMPLICATIONS FROM REGIONAL TRANSIT CENTER ANALYSIS

Given the similarly auto-centric transportation and low development density at the Loudoun Gateway and Ashburn Stations compared to White Flint, Vienna, and Wiehle-Reston, Loudoun County may need to take similar steps of leading the development process through small area plans, encouraging higher density, or providing additional amenities for the station areas to make the locations regionally competitive.

Station Areas in Loudoun County are end-of-line green field sites, and will require an extended timeframe to achieve a higher-density development typology seen at other Metrorail stations. Developers and land owners may have to take a long-term approach to phasing and development, and anticipate build-out over a 10 to 20 year time horizon.

- Development does not happen overnight:** Development may take a while to respond to Silver Line service and achieve the desired density and mix of uses seen at other competitive nodes. For example, the community in the Rosslyn-Ballston corridor started planning for the stations in the 1960s and 1970s before the stations opened in the mid-1970s. Prior to the opening of the Metrorail Stations, Rosslyn only averaged 700,000 SF of office development every five years and Ballston only averaged 225,000 SF every five years. After the stations opened, the rate of development increased rapidly, with Rosslyn adding 3.2 million SF in the first 10 years and Ballston adding 2.1 million SF within ten years of the Metrorail opening. The rate of growth in Ballston accelerated as Rosslyn was built out and developers moved further out on the Orange Line. In 2015, Rosslyn has 9.5 million SF of office space (that is now starting to be redeveloped with larger projects such as the JGB's CEB Tower) and Ballston has 9.6 million SF of development within a half-mile of the Metrorail Station, but it has taken over 35 years to develop.

Figure 2-19 : Aggregate Office Development a Half-Mile from Metrorail Stations



- End-of-line stations must balance commuter parking and pedestrian accessibility:** Many end-of-line stations were designed to serve as large parking facilities for commuters to transition from automobiles to Metrorail service, and have little infrastructure or amenities on site to enhance a

pedestrian experience. While preserving parking capacity at outer Metrorail stations is critical, parking facilities need to be integrated into a development pattern which prioritizes the pedestrian experience and generates activity.

- **Long-term development strategies are needed:** As Loudoun County moves closer to the arrival of the Silver Line, the strategy for commuter parking and development density will become more critical to the long-term success of the stations. County direction, through the development of an urban street grid, the definitive siting of parking structures, or facilitating development density may be strategic opportunities to guide private development towards a more desirable development outcome.

Loudoun County has ample space around the Loudoun Gateway and Ashburn stations to enable large-scale, mixed-use development that generates activity. Large parcels and open land enable creative thinking for innovative projects.

- **Lower development costs:** Loudoun County has more open land with fewer complications (demolition, site constraints, coordination with multiple land owners and adjacent buildings) for developers; enabling a quicker development process, saving developer's time and expenses compared to other, denser locations.
- **A mix of uses drives activity:** A mix of office, residential, retail and entertainment encourage activity during all times of the day. Activity is driven by office workers during the day and residents and visitors on nights and weekends.
- **Activity without office and residential:** Without a strong office market, and residential restrictions at Loudoun Gateway, developers will have to identify alternative anchor uses which either provide a temporary use until the office market returns, or replaces office and residential with other uses that create a similar level of activity.

COMPETITIVE POSITION WITHIN THE SILVER LINE CORRIDOR

The HR&A Team conducted a deeper dive into the current market trends and conditions in four competitive market areas along the Silver Line that directly compete with the Ashburn and Loudoun Gateway station areas and selected the Tysons Corner, the Reston Town Center, and Innovation Center Metrorail stations. The goal of this analysis was to assess the competitive pipeline of planned and existing developments to identify market potential and strategies for development at the Loudoun stations that would either complement or compete with other development in the corridor. The Team evaluated the current market conditions for office, retail and residential uses within a half-mile radius of each Metrorail station or proposed station location.

- **Silver Line Access:** Tysons Corner, Reston Town Center and Innovation Center will be situated along the Silver Line and riders will have to pass through these stations before arriving at destinations in Loudoun County. As such, any one of those stations is a direct competitor for Silver Line riders who have a choice to locate at any of the other stations versus Loudoun Gateway or Ashburn stations.
- **Development Horizon:** While Tysons Corner and Reston Town Center have established development typologies and regional reputations, the new station areas are being developed on vacant land and can either develop in a way that builds on the regional reputation of the area, or differentiate itself with an alternative blend of development uses.

- **Site Control:** each of the proposed study areas has a number of private owners who are able to influence the development process. The ability to align private development interests within the long-term public vision for each station area is of critical importance.

Please see Attachment B2 in the Appendix for additional detail on development, proposed development pipelines, rents, and occupancy trends in the Silver Line. Analysis of the Silver Line competitive Station Areas focused on the current real estate conditions, and how those may factor into development opportunities at the Station Areas. A detailed overview of the sites is included in Attachment B3 in the Appendix which covers current development and pipeline developments.

CONCLUSIONS AND IMPLICATIONS FROM SILVER LINE ANALYSIS

New station area development along the Silver Line is occurring in undeveloped land, and adjacent development exhibits similar real estate conditions to station areas in Loudoun County. Conditions at Loudoun Gateway and the Ashburn Station are on a level playing field in comparison to the other Silver Line Stations.

- **Market conditions along the Silver Line are similar to those in Loudoun County.** New station areas along the Silver Line have high office vacancy rates above 19%, are seeing increasing amounts of multi-family development designed to capture rail proximity, and strong retail demand with vacancy under 1%.⁷⁶
- **New development is associating with adjacent destinations to help create a station identity.** To bolster the branding of new development, local developers are positioning new development at competitive station areas as extensions of existing development. For instance, at Tysons Corner and Reston Town Center developers are using the regional cache of established anchor uses to bolster the reputation of new development. Meanwhile, Innovation Center will be anchored by the Center for Innovative Technology, and will build upon an identity as a tech and research destination. To compete in this market, development around the Loudoun Gateway and Ashburn stations will need to be branded to be differentiated from development around other stations.

The Silver Line station areas in Fairfax County have high office vacancy rates and a development pipeline of over 3.7 million square feet of office. Existing vacant office space and a proposed⁷⁷ pipeline of future office development are direct competitors for office development at the Loudoun Gateway and Ashburn Stations.

- **“Shovel ready” office pipelines.** Development projects in the development pipeline may be positioned to begin development when improvements to the office market signal enable profitable development and those projects which are further along in the design and approval process will be better positioned to capture market demand than sites without existing development plans.
- **Improving office conditions.** Improvements to office market conditions will most likely start in built-out office submarkets, such as Washington DC, which offers a vibrant and urban location with high levels of transit-accessibility, or Tysons Corner with its established reputation as a business district with increasing urbanization, before demand to less competitive office markets that are further from the District and urban centers.

⁷⁶ CoStar Market Analytics, Retail, Office, and Multi-Family Overview.

⁷⁷ Proposed developments in the CoStar database include projects which span the development process, from initial visioning for a future development, to projects which have been fully approved and have yet to break ground.

- **Timing of office delivery.** Office space located further from Washington, DC and traditional office markets may need to offer competitive rents or incentives to entice potential office workers to move westward. Without additional incentives or a demonstration of unique location amenities, Loudoun office development may lag until vacancy reaches 5-10% in other station areas on the Silver Line.

Fairfax County has undertaken a comprehensive and collaborative approach to station area planning and development at Tysons Corner, Reston Town Center, and the Innovation Center. Fairfax County has undertaken and completed planning processes to develop plans which address future development around each of the Silver Line Stations.

- **Community engagement leads.** Fairfax County has centered its planning process around community outreach and input to develop Transit-Oriented Development policies around each of the station areas, including design guidelines, land use policies, and strategies to phase in public facilities before land is development by the private sector
- **Initial investment for long-term growth:** By leading the development process and investing in public infrastructure, Fairfax County is providing a long-term development framework to guide private investment. Site specific plans, coupled with public investment at the station areas can signal the County's dedication to a development vision which reduces developer uncertainty and increases the likelihood of private investment.

As the office market may take years to recover, retail is being used as an interim use to generate economic activity. With a regional oversupply of office use, very new little office development is occurring.

- **Weak office outlook:** Current pipeline reports for Northern Virginia indicate there is 2.1 million square feet under construction, but only 395,500 square feet is expected to deliver by the end of 2015.⁷⁸
- **An alternative to office:** In the absence of office activity, developers are investing in temporary retail and residential to create destinations which generate economic activity on site until market conditions improve.
- **Balancing retail development.** Increased retail development may be altering the development pattern and concentration of retail that is appropriate for the market. A reevaluation of the countywide retail policy plan may be appropriate to examine new retail development patterns.

⁷⁸ CBRE MarketView, "Northern Virginia Office, Q1 2015.

APPLICATION OF FINDINGS FROM SILVER LINE ANALYSIS FOR DEVELOPMENT IN LOUDOUN COUNTY

An analysis of ongoing development, development patterns, and the development pipeline along the Silver Line Stations provides an understanding of the development typology and competition that is facing new development at the Loudoun Gateway and Ashburn Stations. Key takeaways from this analysis include:

- **Retail as Activation:** a limited office market has led retail development to become a central component of new development. Utilizing retail to lead proposed developments, or as an interim use, may generate economic activity until the market returns for additional uses. In conjunction with the County's Retail Plan, Loudoun should consider additional retail development at the Station Areas until the office market recovers.
- **Planning for Retail Growth:** new strategies to manage retail growth as an interim and long-term use in the County, and an evaluation of the desired retail mix and potential sites for retail development may be necessary to ensure the retail growth meets future County needs.
- **Strong Residential:** where allowed by zoning, residential development is ongoing or planned within the next couple of years. Development trends favor mixed-use and walkable residential developments and proximity to a Metrorail station can provide a premium on rents for building owners.
- **Challenging Office Market:** Office along the Silver Line Corridor remains challenging with high vacancy rates along numerous submarkets and an existing pipeline with millions of square feet of office waiting to be developed and new office development has been limited to build-to-suit tenants. Any new office development at the Station Areas should sign tenants prior to construction or risk remaining vacant.

VI. AIRPORT-ADJACENT DEVELOPMENT TRENDS

The Team reviewed global airport-adjacent land development patterns to identify trends and uses that could be replicated at the Loudoun Gateway station to leverage its proximity to Dulles International Airport (Dulles Airport). This review, summarized in the Appendix, included high-level research and analysis of 14 international airports: seven in the United States and seven outside of the United States. The selection of these 14 airports and the development elements considered in the trend analysis were determined considering the relevance and potential characteristics and similarities with Dulles Airport and its surrounding counties. Specific elements considered in the analysis included:

- **Exurban:** Establishes if the airport is located within or outside major urban areas.
- **Rail/Transit Access:** Considers the type of transit access to the airport and in particular, if the airport currently or in the near future will have rail access.
- **Transit-Oriented Development:** Evaluates the type and level of transit-oriented development in areas adjacent to and in close proximity to the airport.
- **Hotels:** Examines availability of hotels, number of hotels and rooms at the airport, and/or in adjacent counties within five miles from the airport.
- **Convention/Exhibition/Training Center:** Examines the existence of a minimum 1,000 person convention center, or a large exhibition or training center either at the airport and/or in adjacent counties within six miles from the airport. In this case, the intensity of the color in the table in the Appendix indicates the level of proximity of the convention/exhibition/training center to the Airport. The darkest color indicates that the convention/exhibition center is directly on airport property.
- **Retail Hub:** Considers potential hub attributes of retail development at the airport and its surroundings, including tenant mix, built area, and density.
- **Entertainment:** Assesses the level of development of areas of entertainment at the airport and its close surrounding counties, including theme parks, sport centers, recreational areas for either passengers, airport employees, or residents of surrounding and adjacent lands/counties.
- **Adjacent Residential:** Examines the levels of residential development in close proximity and adjacent to the airport and its surroundings that could be directly impacted by airport operations and its environment, including noise and height restrictions.
- **Office:** Examines the development of office space at the airport and in the areas that are adjacent to and surround the airport.
- **Logistics Clusters:** Examines the existence of logistics clusters defined as geographically concentrated sets of logistics related business activities that have been developed inside airport property and/or in lands adjacent and surrounding the Airport.
- **Health Related Clusters:** Examines the existence of health related service clusters such as a geographical concentration of hospitals, laboratories, and research centers inside airport property and/or in lands adjacent and surrounding the Airport.
- **Enterprise Zones:** Examines the existence of Enterprise Zones, defined as areas where local governments have instituted policies to encourage and facilitate economic growth and development. Policies include the reduction or elimination of taxes, more efficient and streamlined government process, and the relaxation of specific laws and regulations with an aim at encouraging economic development. These can include areas defined as free trade zones, special economic development zones or other export processing zones. The assessment was focused at

examining the presence of these zones inside airport property and/or in lands adjacent and in close proximity (less than five miles) from the Airport.

Principal analytical findings of the airport analysis are as follows:

- Nearly all the airports studied include logistics, office, retail, and exhibition/conference/training center development uses, either at the airport, on land used for purposes other than aviation, or on adjacent land.
 - These non-aviation land uses often rely on the airport to catalyze demand and attract business associated directly and indirectly with aviation-related activities.
 - These areas directly benefit the airport's passengers and employees, airlines, carriers, and operating businesses, as well as adjacent communities, by providing employment and economic development.
- Residential developments are typically found in proximity to urban airports, such as Haneda Tokyo and Washington Reagan National, as well as older exurban airports, such as Frankfurt International, Charles De Gaulle (Paris), Schiphol (Amsterdam), and Heathrow (London). Residential development is less prevalent near newer, holistically-planned airports, such as Kuala Lumpur and Singapore. Residential development close to an airport can be summarized as follows:
 - All airports with residential uses in the flight path have implemented noise mitigation programs through a variety of tools, including purchase of land and development rights and noise insulation. Noise mitigation has also involved changes to airport operations such as aircraft flight procedures, approach speeds, rates of climb, and more drastic measures including limited evening operations.
 - High-density residential developments and limited industrial and commercial developments near older airports do not appear to take advantage of proximity to the airports as an economic opportunity. Most proximate land uses appear to have been planned with the airport as one consideration among a number of nodes, rather than as a central driver of economic development, in the region.
 - Although several airports in recent years have embraced integration with surrounding communities for mutually beneficial land development planning, previous development mistakes have prevented the adoption of best uses of land and even limited the airport's growth in some cases. Such mistakes include residential development under flight paths close to airport runways; development of tall structures penetrating required approach and departure protection zones; development of land that might be required for future airport growth; and other land development which disregards the airport's needs.
 - Lack of coordinated land development efforts between airports and adjacent counties may lead to long-term challenges, including poorly integrated development, residential noise complaints, and hindrances to future airport growth limiting potential economic benefits to surrounding communities. Municipalities adjacent to more recently developed airports are conscious of problems caused by residential development below flight paths and typically avoid authorization of new residential development. These counties favor development compatible with airport proximity: retail, light industrial, hospitality, sports arenas and complexes, and other developments for indoor uses and with limited outdoor exposure.
- Airports are aware of their economic impact on a region and the positive effects of concerted and amicable relationships surrounding land development adjacent to the airport. To foster these relationships, airports have embraced the Airport City/Aerotropolis concept, coined by Professor

John Kasarda⁷⁹ to define an urban plan in which a city's layout, infrastructure, and economy are centered on an airport. This plan is similar in form and function to a traditional metropolis in containing a central core linked to commuter suburbs. Examples include Dallas Fort Worth, Atlanta, Baltimore, Denver, Schiphol, Frankfurt International, Incheon (Seoul), Hong Kong, Cairo, Chicago O'Hare, and Panama City, among others in the U.S. and around the world.

- While the majority of airports studied are located near retail development, Minneapolis has the most significant off-site retail anchor (Mall of America). Other airports, including Singapore and Kuala Lumpur, have significant retail on-site. These airports, and notably large, new airports in the Middle East, are developing facilities, land, properties, and services to serve as destination airports by incorporating high-end retail, customer services, entertainment, and special amenities.
- An additional land use of note is a healthcare facility cluster development in Singapore centered on the Changi General Hospital. A similar facility is part of the expansion plan for Kuala Lumpur.

The analysis ultimately identified two distinct categories for airport-adjacent development typologies:

- The Airport City/Aerotropolis model, with the airport as the gateway to the regional economy and catalyst for nearby commercial development, often on airport property.
- The Airport Destination model, with the airport as a destination in and of itself through development of a singular "anchor" land use. Most often, this use takes the form of large retail, entertainment, or other specialized destination and is typically publicly accessible by rail.

Development around the stations and the County could benefit from either the Airport City/Aerotropolis or Airport as a Destination trend and either development pattern would require close coordination between the County and the Metropolitan Washington Airports Authority (MWAA) to develop. The Airport City/Aerotropolis concept allows the County, as a whole, to benefit from the proximity of the airport and potential development synergies that could enable a broader land development strategy beyond the station areas. This development model also offers the County the opportunity to play a bigger role in how land would be developed while envisioning a countywide approach to development. Alternatively, the Airport as a Destination development option would require a more collaborative relationship between MWAA and the County; it would most likely have the highest impact on the Loudoun Gateway station due to its close proximity to Dulles. MWAA would not necessarily need to lead the development of an Airport as a Destination typology but would have to play a major role in working with the County to promote the airport to all of its current and potential users. Under this development typology, development is more dependent upon MWAA's ability to promote the area to potential users and the County loses some ability to independently promote and benefit from the proximity of the airport.

⁷⁹ Kasarda, John D. "Logistics & the Rise of the Aerotropolis". *Real Estate Issues*, Vol. 25 (Winter 2000/2001).

EVALUATION OF LANDSIDE DEVELOPMENT AT SELECT AIRPORTS

Based on the above metrics and key findings, case studies were narrowed to the following six airports.

These airports were selected since they demonstrate development patterns most relevant to the study as it relates to Dulles Airport. They are:

- Dallas/Fort Worth;
- Frankfurt;
- Singapore Changi;
- Minneapolis/Saint-Paul;
- Kuala Lumpur; and
- Denver.

The top five exhibited similarities, especially transit connectivity and ample proximate hotel space. Denver, the newest of the six, has recently begun construction of a rail link to the city and is working with its neighboring counties to optimize the land uses in the proximity of the Airport. These six airports and their relevant developments to this study will be further described and analyzed in the following pages.

DALLAS/FORT WORTH INTERNATIONAL AIRPORT

Dallas/Fort Worth Airport (DFW) typifies the Airport City model through its coordination with neighboring localities to draft its own comprehensive land use plan. In 2014, DFW was ranked 9th in total passenger traffic worldwide by the Airports Council International (ACI) with more than 63 million passengers. The airport sits on 30 square miles, one third of which is developable land.

In accordance with its land use plan, DFW has been marketing various pieces of this land for industrial, office, hospitality, and mixed-use development. Existing development and plans include, Bear Creek Office Park to the southwest which consists of 1,800 acres of office use and two golf courses. Southgate Plaza to the southeast will become a mixed-use center with hospitality, retail, and restaurant uses alongside a 150,000-square foot office building for DFW's corporate headquarters. Warehousing and distribution centers are proposed to be located within the airport's 2,200 acres of Foreign Trade Zone and along flight paths as a noise buffer. Other existing and planned uses on airport property include an Infiniti car dealership, a center for the U.S. Post Office, and a pet hotel.

Beyond land owned by the airport, the 100,000-square foot Irving Convention Center is accessible by rail as are downtown Dallas and Fort Worth.

From 1974 to 2004, DFW and 10 surrounding cities developed and entered into "zone compatibility". Under these conditions the cities agreed through their zoning regulations to limit development adjacent to the Airport to such activities as commercial, industrial, and retail, and to minimize incompatible land development such as residential, schools, and child care centers. In instances where a city finds that its interests are best served by the approval of incompatible land use within the Airport's noise overlay, the City typically requires the developer to architecturally mitigate (sound proof the facilities), to provide full disclosure to the first and all subsequent buyers through the deed or plat, and to grant an aviation easement (like a city roadway easement, but for aircraft corridors). As a result of this cooperative regional program nearly all of the few noise complaints received by DFW come from outside the noise overlay.

DFW noise contours are used for land use policy by DFW Airport and local city leaders. The outer limits of DFW's original noise overlay encompass approximately 50,000 acres, providing an immense area of mostly compatible land use.

FRANKFURT INTERNATIONAL AIRPORT

Frankfurt Airport (FRA) in Germany also has embraced the Airport City trend with a focus on the creation of an all-encompassing live, work, play environment within minutes of the airport. In 2014, FRA was ranked 11th in total passenger traffic worldwide by the ACI with just under 60 million passengers. It was ranked 7th in international passenger traffic and 9th in cargo traffic—the busiest in Europe at 2.1 million tons for 2014.

Similar to DFW, Frankfurt has marketed its developable land in clusters of industrial, office, hospitality, and mixed-use development. This includes the CargoCity South and Monchhof site areas located less than 10 minutes from the airport which consist of 250 acres of manufacturing and distribution space. The Mönchhof Logistic Park comprises 100 hectares in area, in the northwestern corner of Frankfurt Airport and is the largest, still developing, commercial site in the Frankfurt/Rhein-Main region. Other major developments include The Squire, an office building envisioned as a “work-city” and completed in 2011. The Squire contains more than 2 million square feet of office, specialty retail, dining, and service industry uses, offering a strategic location for businesses with its proximity to the airport (accessible by footbridge), high-speed rail (the building sits above the train station), and major highways. Additionally, Frankfurt is finalizing plans for Gateway Gardens, a 90-acre mixed-use center in an area formerly used as housing for the United States Air Force. Upon completion in 2021, Gateway Gardens will include office, hospitality, conference, restaurant, retail, recreational, and educational space as well as some multifamily residential buildings intended for airport and airport-related business employees.

In 2012, courts in Leipzig, the district where the airport is located, upheld a provisional ban, originally imposed by another court in October 2011, on all take-offs and landings between 11 p.m. and 5 a.m. at the airport following complaints by local residents. This ban is still in place and has forced primarily cargo operators to operate from nearby airports that do not ban late night operations.

SINGAPORE CHANGI INTERNATIONAL AIRPORT

Singapore Changi Airport (SIN) is the closest example of a hybrid between the Airport City model and the Airport as a Destination model owing to the uniqueness of the airport itself combined with surrounding commercial development. In 2014, SIN was ranked 16th in total passenger traffic worldwide by the ACI with 54 million passengers. It also was ranked 6th in international passenger traffic and 13th in cargo traffic, handling 1.8 million tons in 2014. It also was voted the world's best airport and the best airport for leisure amenities in 2015 according to passenger surveys conducted by Skytrax.

SIN owes much of its economic success to the 750,000 square feet of high-end retail spread across its three terminals, reporting \$1.5 billion in sales in 2014. The airport also boasts a rooftop pool and indoor butterfly garden among other entertainment options. Outside of the airport a network of rail-accessible development, including two technical universities, Changi General Hospital, Changi Business Park (a 175-acre financial and technology hub), the Singapore Expo (10 convention halls covering one million square feet), and a country club with golf course—are within five miles of the airport.

The airport has made special efforts to be viewed as a destination on its own and has developed a variety of services and amenities to take advantage of its strategic geographic location for connecting passengers and businesses. Frequently ranked among the top airports regarding the quality of services

and facilities, Singapore continues to develop business and properties in conjunction with its neighbors to expand its strategic role for the economic development of the country. Three of the four runway ends of the airport border the sea, so approach and departure procedures are over water, thus limiting aircraft-related noise exposure to surrounding communities. Noise abatement considerations are factored into Changi Airport's long-term airport master planning. Only departures towards the south on Runway 1 fly over a small portion of land that has been designated for nonresidential use.

Land use planning around the airport is conducted by the Urban Redevelopment Authority (URA), which zones land surrounding Changi Airport for residential use in accordance with international standards on noise levels.

KUALA LUMPUR INTERNATIONAL AIRPORT

Kuala Lumpur International Airport (KUL) aims to become a major retail destination with the opening of a major outlet mall less than four miles from the airport. KUL was ranked 20th in total passenger traffic worldwide with 48.9 million passengers in 2014 by the ACI. This represents only a three percent increase from 2013, but the airport saw a 19% increase between 2012 and 2013. It also was ranked 13th in international passenger traffic and 28th in cargo traffic (775,000 tons in 2014).

The airport has reserved 6,750 acres of surrounding land for development of what they refer to as an Aerotropolis. Within this land, the airport plans to develop a commercial business district that houses office parks, retail/commercial centers, an auto mall, exposition/convention center, medical center, training center complex, and service apartments. There also are plans to build golf courses, a boutique hotel, and a theme park, as well as agro-tourism tracts of land.

Development of various commercial areas is well underway with the Mitsui Outlet Park KLIA Sepang as a major leader. The outlet mall is expected to capitalize on the growing number of passengers at KUL. Phase 1 of the project, opening in 2015, consists of 140 outlets with more than 270,000 square feet of space. By 2021, phases 2 and 3 will increase the space to 260 shops and 500,000 square feet. The park will be accessible to Airport passengers via shuttle bus and patrons will be able to check the status of their flights on displays throughout the complex.

Eventually, KUL hopes to complement the Outlet Park with industrial, office, logistics, entertainment, and event spaces similar to the airport cities discussed previously. With the exception of the Sepang International Circuit Formula 1 racetrack, the surrounding land is largely undeveloped.

The Airport's strategy in reserving such a large amount of land is to control the planned development of lands around the airport and use the airport as the center of economic development. In addition, airport planners view development of land around the airport as an opportunity to enhance KUL's position as a destination airport.

MINNEAPOLIS-SAINT PAUL INTERNATIONAL AIRPORT

Minneapolis-Saint Paul International Airport (MSP) has achieved economic success due to its proximity to a major tourist-entertainment destination—The Mall of America. MSP was ranked 43rd in total passenger traffic worldwide for the year 2014 by ACI (16th in North America), moving 35 million people.

The Mall of America, with 4.87 million square feet of gross building area, is not only a major shopping destination, but also includes an indoor theme park, an aquarium, and event space. The Mall typically draws around 40 million visitors annually, 40% of which are tourists. Due to the close proximity to the MSP Airport, 12 minutes by train, even passengers waiting for a connection can make a visit.

While the Mall of America reports generating nearly \$2 billion annually for the state of Minnesota, minimal commercial development exists otherwise. Apart from the Fort Snelling golf course and national cemetery, the majority of the airport is bordered by residential communities. Recently the Mall of America has launched a \$325 million expansion to increase parking, additional retailers, add a food court, a new 342-room luxury JW Marriott Hotel, and a seven-story office building. Future expansion of the Mall's entertainment uses include the potential development of an indoor waterpark and indoor skating rink, however there is not timeline for the development of those features.⁸⁰

In 1992, the airport created the Metropolitan Airport Commission's (MAC) Sound Insulation Program and Noise Mitigation Program which is still active and is aimed at reducing aircraft noise impacts associated with MSP by providing noise reducing modifications to homes, apartment buildings, and schools.

DENVER INTERNATIONAL AIRPORT

Denver International Airport (DEN), located approximately 25 miles from Denver, was opened in 1995. As of 2014, DEN was the 18th busiest airport in the world and 6th busiest in the United States by passenger traffic. The airport has six runways served by a single terminal and three midfield concourses. At 53 square miles, it is the largest airport in the United States by total area.

Denver was designed to rectify the land use/noise impact problems surrounding the previous location of Stapleton International Airport. The location of the Denver Airport and the plot of land acquired was chosen for its ability to provide a land buffer between the airport and the surrounding communities, and to protect members of those communities from the negative effects of close proximity to the Airport. DEN was conceived as the model airport for operational flexibility and land use management, however, it has begun to suffer many of the same land use management-related issues felt by older airports facing zoning challenges from surrounding communities to modify zoning areas to less compatible uses that could negatively impact future airport growth and aircraft operations.

Denver is the latest airport to pursue the Airport City/Aerotropolis concept type development with the goal of planning land uses in and around the airport to produce the most compatible and economically viable land used. Denver currently has an additional 9,000 acres available for commercial development. The proposed Airport City is envisioned as five district components:

- "City Center" imagined as the convergence point between the vibrant business community and the Airport's ongoing development initiatives.
- "City Gateway" with mixed-use commercial and transit-oriented development.
- Logistics center oriented to rapid shipping facilities with international reach.

⁸⁰ Webb, Tom. "Mall of America breaks ground on start of luxurious expansion." *Twin Cities.com* Mar 18, 2014.

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- "Aero District" offering secure access to cargo, aerospace, aviation and military operations.
- "Tech District" emphasizing global collaboration between aerospace manufacturing, aviation, renewable energy, biosciences, and other tech industries.
- "Agro District" for food processing/distribution, cold storage, greenhouse agriculture, bio-fuel industry, and warehouse space.

By the second quarter of 2016, DEN will be connected by rail to downtown Denver which has already experienced positive impacts of development and interest from developers as a result of the direct airport connection. Gateway Park is an example of an area receiving new attention from developers. Gateway Park is a 2,000 acre tract of land, conceived in the early 1990 as a major multi-use development complex when the airport was planned and under construction. The property borders the Airport and was annexed by the City to take advantage of potential spillover economic benefits from the Airport, which opened in 1995. However, developments on the property have not occurred as quickly as envisioned. However, the most prominent development which has occurred is dubbed the, "Denver Connection" and is a 400-acre mixed-use development. The developer has promoted the location of the development as a primary selling point, "in the middle of everything -- 15 miles from downtown, eight miles from Denver International Airport, five miles from the Anschutz Medical Campus, 13 miles to the Denver Tech Center, and surrounded by residential neighborhoods home to a highly educated work force" creating a wide and diverse pool of potential office users, residents, shoppers and visitors to the development. Several retailers are already operating on 27 acres of Denver Connection land include Walgreens, Chase Bank, TCF Bank, Carl's Jr., McDonalds, 7-Eleven, Family Dollar, and an inline building with frontage on 48th Avenue that includes an H&R Block, a Domino's Pizza, and medical and dental offices.

VII. POTENTIAL CATALYTIC ANCHOR USES

EVALUATION FRAMEWORK

The development of catalytic anchor land uses at the Loudoun Gateway Station could help establish the station's identity and potentially accelerate ancillary development. To assess this potential, the HR&A Team conducted a preliminary evaluation of a set of potential catalytic anchor uses. These were determined based on an assessment of real estate market conditions in the area, analysis of trends in airport-affiliated development at airports around the world, and stakeholder interest in the potential for these specific uses. The anchor uses include:

- Convention center and hotel;
- Destination retail, entertainment and hotel;
- Research center;
- Tech incubator;
- Sport and recreation facility; and
- Professional sports stadium.

To evaluate the potential of each catalytic anchor use to catalyze Station Area development, the HR&A Team developed a matrix of evaluation criteria, ranging from compatibility of the Loudoun Gateway site with the anchor use, to potential economic impacts. These criteria aim at assessing the compatibility of the site to the particular size and zoning requirements of the use; assessing related market demand; and conducting a high-level cost-benefit analysis.

| Site Compatibility | Market Support | Locational Impacts | Cost-Benefit Analysis |
|---|--|---|---|
| <ul style="list-style-type: none"> • Facility/lot size requirements • Site constraints • Zoning compatibility • Transportation and infrastructure needs/impacts • Compatibility with Dulles Airport noise contours | <ul style="list-style-type: none"> • Market demand • Competitiveness of Loudoun Gateway site | <ul style="list-style-type: none"> • Impact of connection with Metrorail • Impact of Dulles Airport | <ul style="list-style-type: none"> • Level of public investment required • Potential, high-level economic impacts |

STATION AREA CONTEXT

The area studied for potential anchor uses at Loudoun Gateway is a composite of several zoning districts: Planned Development Industrial Park (PD-IP); Planned Development Office Park (PD-OP); and Planned Development General Industrial (PD-GI). All of these districts were created through rezoning with related proffers. The area is also subject to the 65 LDN⁸¹ noise overlay from Dulles Airport, and the presence of floodplains on the west is associated with the Broad Run. There may be stream valley buffers and wetlands that could impact development on-site.

The Comprehensive Plan designates a portion of the station area as industrial or “Route 28 Business”; however, the area planned for “Route 28 Business” land use is too small to be considered as a potential site for the development of an anchor use. The Zoning Ordinance does include the PD-SA zone, for “Special Activity Uses,” which would allow by-right development of a stadium, park, and convention center. However, land owners would have to request a rezoning to develop uses allowed under PD-SA zoning. The PD-SA zone includes guidelines for setbacks from roads and residential, and the rezoning would allow the County the opportunity to impose additional development constraints, as well as requests for a reduction and/or share in required parking.

The roadway network planned for the area (as shown on the County Transportation Plan) will link Loudoun Gateway to the east and west (Prentice Dr. & Shellhorn Rd) of Loudoun County. North-south transportation links are already in place (Loudoun County Parkway, Route 606 and 28) and can be widened as required. The future Loudoun Gateway Station presently contains the Park and Ride for bus facilities which can be expanded and altered as the trains arrive. The addition of Metrorail will only increase the transportation modes available at the Loudoun Gateway Station.

EVALUATION OF ANCHOR USES

Convention Center with Hotel(s)

Convention centers are a common anchor use for airport-adjacent areas, in part due to the value of proximity to the airport for conventioners.

Site Compatibility

The Loudoun Gateway Station Area could accommodate a competitively-sized convention center facility, with land needs estimated at 50 acres. A modern convention center also constructed on a greenfield site, the Gaylord Convention Center in Prince George’s County, Maryland, serves as a useful precedent for a high-level site compatibility analysis. The Gaylord provides 470,000 square feet of convention space over two floors, and includes 2,000 hotel rooms in two 20-story towers. It additionally offers a combination of surface and structured parking. To accommodate a convention center of this size, exclusive of any ancillary retail, residential, and other amenities, development at the Loudoun Gateway site would require 50 acres. This size requirement may be lower, however, when considering a reduction in parking needs due to Silver

⁸¹ The Loudoun County Airport Impact (AI) Overlay District zoning ordinance uses the acronym LDN to refer to noise level categories. According to the Revised 1993 Zoning Ordinance, AI-Airport Impact Overlay District § 4-1406 (A) (2015), Ldn: The symbol for “yearly day-night average sound level”, which means the 365-day average, in decibels, for the period from midnight to midnight, obtained after the addition of ten decibels to sound levels for the periods between 10 p.m. and 7 a.m., local time. The Federal Aviation Administration uses the acronym DNL (Day-Night Average Sound Level) to refer to the same noise categories. This report uses LDN when referring to the Loudoun County AI Overlay District zoning ordinance and DNL when referring to FAA rules.

Line access. While noting that zoning and environmental constraints may ultimately limit the size of the site, there are areas within a half mile of both the Ashburn and Loudoun Gateway stations that could accommodate a convention center of 50 acres or more.

Attachment C-3 in the Appendix provides an example of the Gaylord Convention Center situated at the Loudoun Gateway Station, demonstrating where a convention center could fit within the 65 LDN, with minimum impact to the floodplain and roadways. At the Ashburn Station there is ample undeveloped land on the south side of the Greenway at Moorefield Station But a convention center is not contemplated in the currently approved rezoning.

Market Support

It is expected that demand for convention center facilities will continue to rise as regional employment is forecast to grow. As described earlier in this report, there was a nearly 100% increase in the number of jobs in Loudoun County between 2000 and 2013. While employment growth has recently slowed due to reductions in federal spending and sequestration, it still increased at an annual rate of about 5% from 2010 to 2013. Industry reports indicate that the number of conferences nationally increased slightly from 2009 to 2012, irrespective of the economic downturn and that there was a 10% increase in the number of conference participants.⁸²

Trends in convention center bookings indicate that bookings are driven by the appeal of a location, rather than the final cost for attendees. Based on changing trends in the conference industry, the most competitive conference centers are those that provide flexible conference space and a dynamic after-hours experience in a vibrant location with entertainment, retail, and restaurants for conventioners.⁸³ Access to hotel accommodations is also important, with 85% of meetings nationally in 2012 conducted at venues with lodging.⁸⁴

Existing convention center facilities proximate to potential development sites at the Loudoun Gateway and Ashburn Station Areas are older facilities, with less capacity. Area convention centers include:

- **The National Conference Center**, located 13 miles north of Dulles Airport in Ashburn, was constructed in 1974. It has 265,000 square feet of conference space and the largest room capacity on-site can hold 1,800 guests. Accessible only by car, the National Conference Center is situated on a large campus with ample greenspace and surrounded by a residential community
- **Westfields Marriott Washington Dulles** is a hotel and conference center located just south of Dulles Airport. Built in 1990, Westfields Marriott is smaller than the National Conference Center, with 40,000 square feet of meeting space and a maximum room capacity of 1,100. Like the National Conference Center, it is only accessible by car. Due to the on-site hotel and the limited conference space available at Westfields, the center is mostly used for weddings, large group events, and small conferences.
- **Hilton Washington Dulles Airport** is a hotel and conference center located three miles from Dulles Airport. Built in 1986, the conference facility is 40,000 square feet, with a maximum room capacity

⁸² Convention Industry Council. "2014 Economic Significance of Meetings to the US." *Convention Industry Council*. Accessed June 18, 2015 at: <http://www.conventionindustry.org/Files/2012%20ESS/140210%20Fact%20Sheet%20FINAL.pdf>

⁸³ Bolduc, Jessica. "The Top 10 Trends for Corporate Meeting Planning." *OnCallInternational.com* Accessed May 12, 2015 at: <http://www.oncallinternational.com/blog/top-10-trends-corporate-meeting-planning/>

⁸⁴ Convention Industry Council. "2014 Economic Significance of Meetings to the US." *Convention Industry Council*. Accessed June 18, 2015 at: <http://www.conventionindustry.org/Files/2012%20ESS/140210%20Fact%20Sheet%20FINAL.pdf>

of 800 guests. While proximity of the facility to Dulles gives it a competitive advantage for attracting airport visitors, the small conference facility limits meeting size.

- **Dulles Expo Center**, six miles south of Dulles Airport offers 100,000 square feet of exhibition space and 1,200 free parking spots for trade shows and exhibitions. The facility was constructed in 1995 and its largest room can host 5,000 guests. A full-service Holiday Inn with 233 rooms is adjacent to the Dulles Expo Center.

These facilities indicate a gap in market for a newer convention center facility with on-site retail, entertainment, and hotel rooms, as well as public transit access. A large conference center in Loudoun County could potentially compete with conference centers in the District and Maryland, and offer a lower booking cost and extensive on-site amenities as part of a larger entertainment district.

Impact of Connection with Silver Line

The Silver Line will offer convenient public transit access to the site, which is lacking among existing Loudoun County convention centers and at the National Harbor (which does not have rail access, but does have a ferry). The rail access would make a convention center facility, as well as any other amenities on-site, accessible to conventioners and visitors from throughout the Washington, DC region, as well as other domestic and international locations by virtue of connectivity to Dulles Airport. As Phase I of the Silver Line has outperformed projections in ridership⁸⁵ it is not difficult to imagine this may happen with Phase II as well, given connectivity to Dulles Airport, bringing visitors to the convention center and its auxiliary uses.

Impact of Dulles Airport

Proximity to Dulles Airport is anticipated to be mutually beneficial for both the convention center and the airport. Airport adjacency is an attractive amenity for convention planners coordinating meetings that will draw a regional, national, and/or international audience. The accessibility of Dulles, as a major international and domestic airport hub, would make it easy for conventioners to reach the facility. Convention center adjacency to Dulles Airport could also bring more passengers to the airport, which has been a goal of the Metropolitan Washington Airports Authority (MWAA).⁸⁶ Airport case studies revealed that a number of airports are planning conference facilities in close proximity, such as the Westin Hotel and Conference Center at Denver's Transit Center, or the planned conference center at Frankfurt's The Squaire. Other airports, such as Atlanta International Airport in Georgia have provided direct rail transportation between the airport and a conference facility. (Please see the case study on the following page for additional detail).

Cost-Benefit Analysis

A competitive convention center facility, with entertainment and retail uses on-site, would likely require a public authority such as the County, MWAA, or the Commonwealth to manage the process and provide incentives to attract private sector interest. Recent convention centers have used public-private development initiatives requiring the local jurisdiction to offer financial assistance for developers. For example, between 2004 and 2009, Prince George's County issued over \$245 million in bond financing to National Harbor in order to facilitate the development of Gaylord National Convention Center and the necessary parking facilities and public infrastructure to support it. These bonds are scheduled to be repaid

⁸⁵ Washington Metropolitan Area Transit Authority. "Early Ridership on the Silver Line." Accessed on June 18, 2015 at: <http://planitmetro.com/2014/10/08/early-ridership-on-the-silver-line/>.

⁸⁶ Aratani, Lori. "Dulles International Airport struggles to find its footing." *WashingtonPost.com*. Accessed on June 18, 2015 at: <http://tinyurl.com/pbqulov>.

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through a variety of mechanisms including hotel rental tax revenues, tax increment revenues, and backup special tax revenues.⁸⁷

Convention centers can produce substantial economic impacts to justify public investment by generating tax revenues and creating jobs during construction ongoing operations. However, the ongoing jobs are most likely to be lower-wage jobs in the hospitality and retail sectors. Convention attendees are likely to spend in the local economy, generating sales taxes on retail and food (6% tax with 5% going to the state and 1% to Loudoun County) and a hotel occupancy tax of 5% on hotel nights which similarly divides revenue between the state and County (4% and 1% respectively).⁸⁸ According to industry reports, on a national level, conventions generated direct fiscal impacts of \$13 billion in state and local tax revenues in 2012. When combined with indirect and induced impacts, the convention industry nationally generated nearly \$38 billion in state and local tax revenue.⁸⁹

Case Study: Georgia Convention Center



Located adjacent to the Atlanta International Airport, Georgia International Convention Center (GICC) offers a useful precedent for the potential development of a convention center at Loudoun Gateway. Opened in 2003, GICC is the second-largest convention center in Georgia at 400,000 square feet. The GICC is part of the 155-acre Gateway Center Complex commercial development, with 1.1 million square feet of office, hotel, and retail. The facility is

connected to the airport via SkyTrain, an automated people mover system, which moves passengers to the airport in five minutes.

The building is owned and operated by the City of College Park and was built as a public-private partnership managed by American Resurgens Management Corp.⁹⁰ The convention center has been supported by a dedicated marketing organization, Meet College Park, which in under seven months in 2014 alone generated nearly \$13 million in revenue from booking 25 meetings and conventions for the following two years.⁹¹

GICC is estimated to have generated \$33 million in direct economic impacts in 2012, including 655 jobs.⁹² Additionally, it has catalyzed an estimated \$2 billion in residential and commercial development in the surrounding College Park area since its construction.

⁸⁷ MuniCap, Inc. Public Finance. "National Harbor Case Study." Accessed at: <http://www.municap.com/case-study-national-harbor.htm>.

⁸⁸ Virginia Department of Taxation. "Sales and Use Tax." Accessed Jun 23, 2105.

⁸⁹ Convention Industry Council. "2012 Economic Significance Study – Key Findings." Accessed on June 18, 2015 at: <http://www.conventionindustry.org/ResearchInfo/EconomicSignificanceStudy/ESSKeyFindings.aspx>.

⁹⁰ PRNews Wire. "New Georgia International Convention Center Officially Open." Accessed on June 18, 2015 at: <http://www.prnewswire.com/news-releases/new-georgia-international-convention-center-officially-open-71245057.html>

⁹¹ Meet College Park, Georgia. "Meet College Park, Georgia Convention & Visitors Bureau Announces 12.9 Million Dollar Impact." Accessed on June 18, 2015 at: <http://tinyurl.com/onhu5ut>.

⁹² Georgia International Convention Center. "New Georgia International Convention Center Officially Open." Accessed on June 18, 2015 at: <http://tinyurl.com/okac6uo>.

Destination Retail, Entertainment, and Hotel Use

As analyzed in an earlier section, the combination of anticipated population growth and high median household income in Loudoun County suggests continued market demand for retail and entertainment uses.

Site Compatibility

Parcel size requirements for retail and entertainment uses vary widely depending on the desired number of retail tenants and seating or standing capacity for entertainment venues. Designs for retail and entertainment uses can be tailored to specific site conditions.

Market Support

With population expected to grow, as described in earlier sections, there is significant market support for retail and entertainment uses. Retail vacancy rates in the region have declined in recent years – to 5.6% in Q4 2014.⁹³ Regionally, demand is strong for entertainment and retail districts that are easily accessible, walkable, and mixed-use environments. The mix of uses serves to create 24/7 activity, attracting visitors to the site throughout the day, and ultimately, retailers due to anticipated pedestrian traffic.

Even with strong regional competition for mixed-use retail districts, including Dulles Town Center Mall and One Loudoun, retail at the Loudoun Gateway Station is potentially better positioned to attract a large consumer base due to a strategic location easily accessible by both the Silver Line and by car. The addition of an entertainment component would enhance the retail experience at the Station Area and create a unique regional destination that would be attractive to visitors from outside of the County. Based on a scan of cultural and entertainment venues in Loudoun County, the local market does not appear to have kept up with population growth. Performing arts venues are limited to community theaters in Herndon, Reston, and Purcellville that seat 250-300 people. Residents must go to Fairfax County, Montgomery County, or the District for major musical or performing arts events. Arts and culture venues would work well at Loudoun Gateway, filling this gap in existing retail market offerings. The combination of a growing residential population, transit accessibility, and ample space for new development offers an opportunity to create a regional retail and entertainment destination that will be distinctive from regional competitors. The following precedents are indicative of the types of entertainment and cultural uses that could be developed near the Metrorail stations.

- **Strathmore** is a multi-disciplinary arts center in Bethesda, MD located at the Grosvenor Metrorail stop along the Red Line. Programming at Strathmore includes musical performances by internationally renowned artists and the National Philharmonic, educational seminars, community performances, outdoor summer concerts, and hosts more than two dozen art exhibitions each year. While Strathmore is a very active arts center, the location along Rockville Pike in an auto-oriented suburban neighborhood has precluded the development of adjacent retail and commercial uses which would generate additional activity on-site. Currently all activity is driven by the strength of Strathmore's programming and the site has not become a destination for additional uses. Nearly 96,000 people attended Strathmore's programs in FY2013-2014.⁹⁴ An arts center at Loudoun Gateway, similar to Strathmore, could include additional development such as shops and restaurants which are currently lacking at Strathmore.

⁹³ Delta Associates, "Year-End 2014 Washington, DC Metro Retail Outlook"

⁹⁴ Strathmore. "Up Close and Amazing: FY13 & FY14 Biannual Report." Accessed on June 18, 2015 at: https://d1gyqfmin8fvt3.cloudfront.net/www/pdf/FY13-14%20Annual%20ReportCKD_Web.pdf

- **Silver Spring** is a retail and entertainment destination in Silver Spring, MD. A vibrant downtown with a mix of retail, entertainment, office and residential uses which create 24/7 environment for visitors. In 2001 the State of Maryland approved an Arts and Entertainment District in Silver Spring to promote community engagement, tourism, and revitalization through tax incentives to attract artists, galleries, and entertainment businesses to the area. Popular entertainment destinations in Silver Spring include the Fillmore is a live music venue with capacity for 2,000, across the street is the historic AFI Silver Theater and Cultural Center which hosts movies, film festivals, and film education.

Impact of Connection with Silver Line

The Silver Line could bring a substantial local and regional consumer base to the Loudoun Gateway site for shopping and entertainment. Currently, the completed portion of the Silver Line has received around 15,000 entries per weekday combined across the five open Silver Line stations. As of September 2014, ridership at the retail destination Tysons Corner was already at 51% of the projected level (or around 2,500 entries per weekday), higher than ridership at McLean, Greensboro, and the Spring Hill stations which do not have a strong retail anchor.⁹⁵ A retail and entertainment destination at Loudoun Gateway could attract a similarly large proportion of Silver Line riders. However, retail and entertainment uses at the Loudoun Gateway Station area will need to differentiate themselves from the established retail at Tysons Corner which could be a direct competitor for Silver Line riders. With the completion of the Silver Line Metrorail, passengers at Dulles with a long layover, or even residents in the region, would have a choice of shopping at Tysons or a potential retail destination in Loudoun County.

Impacts of Dulles Airport

Dulles Airport attracts a large local, regional, domestic, and international consumer base to the area, including both passengers and airport employees. A retail and entertainment anchor with a diverse mix of tenants could attract residents and visitors en route to, or departing from, Dulles Airport. Silver Line connectivity will make a visit possible for travelers with a layover; however, to be a draw, the retail and entertainment would need to offer a distinctive experience beyond that which is found in the airport. The successful symbiotic relationship between transit and retail/entertainment can be seen in the U.S. with the Mall of America which is a short train ride away from the Minneapolis/Saint-Paul Airport. The proximity of the Mall enables passengers at MSP to quickly reach the Mall during layovers, and the Mall of America has added a number of amenities, such as baggage lockers, to facilitate the unique needs of travelers. Internationally, the Kuala Lumpur airport in Malaysia is developing a large retail outlet mall adjacent to the airport to facilitate a similar shopping experience for air passengers.

Furthermore, airport adjacency additionally can be a draw for big-box retail tenants due to proximity to logistics and supply chain networks. IKEA has chosen to locate near airports in several cities – including Minneapolis; Portland, Oregon; and Brisbane, Australia – benefitting from this access as well as the zoning flexibility that airport authorities may offer. The 120-acre mixed-use Cascade Station project, near Portland International Airport in Oregon, has been successful at attracting tenants, enjoying a vacancy rate below 5%, and features IKEA, Best Buy and REI Sports.⁹⁶

⁹⁵ Washington Metropolitan Area Transit Authority. "Early Ridership on the Silver Line."

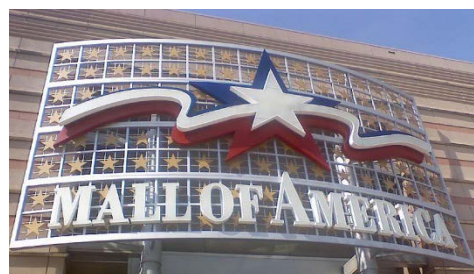
⁹⁶ LeTourneur, Chris and Andrew Fayn. "Destination retail." *Airport World*, Feb-March 2011. Accessed on June 18, 2015 at: <http://www.mxddevelopment.com/strategists/wp-content/uploads/2013/12/AW-1-2011-Destination-Retail.pdf>

Cost-Benefit Analysis

Retail and entertainment destinations are typically commercially-driven projects and are less likely to require a substantial public subsidy to incentivize development than other anchor uses. Retail and entertainment uses typically generate tax revenues and income for the jurisdiction, in addition to creating construction and on-site jobs to support ongoing operations. However, based on the proposed size and mix of uses in a retail and entertainment development, state and local jurisdictions may offer incentives, such as Maryland's Arts and Entertainment Districts, which offer tax-related incentives to encourage artists, arts organizations and other creative enterprises to locate in areas previously unaffordable. Even with development incentives it is likely that the ongoing sales and income taxes generated by a retail or entertainment destination would generate a positive financial return for the County.

Case Study: Mall of America

The development of retail and entertainment venues without residential uses is challenging, but Mall of America serves as a national example of a successful retail and entertainment destination without a residential component that attracts millions of annual visitors. With over 4.87 million square feet of gross building area, Mall of America is home to over 520 stores, a 1.2 million gallon aquarium at Sea Life, home to Lego World and Nickelodeon Universe and attracts more than 40 million



annual visitors. The Mall of America is also directly connected to the Minneapolis/Saint-Paul Airport by light rail, enabling airport passengers to reach the mall in about 12 minutes. The Mall of America generates nearly \$2 billion in annual economic activity for the state of Minnesota.⁹⁷ The expansive size of the Mall of America generates a huge tourism draw, and four out of 10 visitors to the Mall of America are tourists. Mall of America has received subsidies to foster its growth. In 2013, Mall of America benefitted from approximately \$250 million in tax breaks through a property tax exemption, authorized by the State of Minnesota to support its \$1.5-billion expansion plan.⁹⁸ Funds will help pay for roads, utilities and parking facilities to support plans to more than double the size of the mall.⁹⁹

Research Centers

Research centers, such as those affiliated with or sponsored by an institution, a Government entity such as the Department of Defense or National Institutes of Health, or a University are strong economic engines due to a tendency to commercialize research and generate startup companies and new businesses.¹⁰⁰ Research centers sponsored by these entities typically provide a stable base of ongoing funding which enables researchers to focus on developing new ideas and products which typically align with the goals of the sponsor.

⁹⁷ Mall of America. "Mall of America by the Numbers." Accessed May 12, 2015 at: <http://www.mallofamerica.com/about/moa/facts>.

⁹⁸ Vomhof Jr., John. "MOA, Mayo, 3M get perks in final tax bill." *Minneapolis/St. Paul Business Journal*. Accessed on June 18, 2015 at: <http://www.bizjournals.com/twincities/news/2013/05/21/legislature-oks-incentives-business.html>.

⁹⁹ Dornfeld, Steven. "New tax bill laced with special tax breaks for selected businesses." *Minn Post*. Accessed on June 18, 2015 at: <https://www.minnpost.com/politics-policy/2013/05/new-tax-bill-laced-special-tax-breaks-selected-businesses>.

¹⁰⁰ Sheridan, Mike. "Innovation Anchors: Medical and Educational Facilities Drive Development." *Urban Land Magazine*. Aug 1, 2012. Accessed at: <http://urbanland.uli.org/economy-markets-trends/innovation-anchors-medical-and-educational-facilities-drive-development/>.

Site Compatibility

Parcel size requirements for research centers vary widely depending on the size requirements of academic and research tenants, and desired office capacity. The Janiella Research Campus in Ashburn is approximately 700 acres in size, including woods and meadow, while larger research parks may be up to 7,000 acres, like Research Triangle Park in North Carolina. Plans for research centers can be tailored to specific site conditions, such as, for example, the floodplain at Loudoun Gateway.

Market Support

Research centers historically locate in collaborative environments close to universities, medical centers and institutions with initial manufacturing capacity for prototype development. While there is only one existing dedicated research institute in Loudoun County (the Howard Hughes Medical Institute), the proximity to existing renowned research centers such as the National Institutes of Health and Johns Hopkins University, along with health policy makers in Washington, DC, create an environment that is rich for collaboration. Additionally, the County offers a highly educated workforce – with 58% of the population holding a bachelor's degree or higher. Furthermore, there is a large concentration (25%) of local employment in the professional, scientific, management, administrative and waste management services sector, suggesting that segments of the County workforce may already have applicable skills.

As a Station Area anchor, a research center could leverage the accessibility of the Silver Line and Dulles Airport as a strategic advantage to facilitate the exchange of talent and ideas within the region and globally. In addition, an open research campus design at a Station Area could foster a higher level of interaction between the research campus and many of the existing firms within the tech sector, creating opportunities for the sharing of ideas and building momentum from the initial research campus. Through Loudoun County's Small Business Development Center (SBDC) and other regional incubators, researchers at a potential Station Area research campus would have additional support for transforming scientific ideas into products. Spinoffs from research and development at the research center also build upon Loudoun County's ongoing efforts to diversify the economy and encourage greater entrepreneurship and small businesses in Loudoun.

Research center tenants are additionally interested in locations that offer walkable, mixed-use environments, attractive to today's workforce. A 2012 survey of North American university research parks indicated that the most important factors entailed: an environment that encourages innovation and entrepreneurship through access to business incubation resources and startup office space; and access to commercialization resources and services.¹⁰¹

Impact of Connection with Silver Line

Transit-accessible land may be more desirable to research center tenants than land that is not transit-accessible. Metrorail access would provide connectivity to regional research centers and facilities, as well as policymakers. It also would make the site easier to reach for employees and visitors and facilitate greater connectivity and an exchange of ideas between the research center and other entities. In addition, as research centers focus hiring and recruitment among younger graduates from the millennial generation, a research location which enables a walkable and auto-free lifestyle may be appealing to younger employees.

¹⁰¹ Association of University Research Parks. "2012 Survey of North American University Research Parks." Accessed on June 18, 2015 at: https://aurp.memberclicks.net/assets/documents/aurp_batellereportv2.pdf.

Impacts of Dulles Airport

Proximity to a domestic and international airport hub would facilitate access to a research center from domestic and international locations. This could help foster a domestic and global exchange of ideas, helping to attract and retain visiting researchers, as well as making it easier to hold conferences. It also could facilitate formal academic and research partnerships with other entities domestically and internationally.

Cost-Benefit Analysis

While some research centers are associated with private entities, such as those associated with major corporations, a majority of research centers are associated with an institutional anchor like a University which may require local incentives and support in the development of a new research facility. In addition, research centers associated with a university or governmental entity may enable some or all of the facility to be tax exempt, and reduce the local property tax which generated at the site. However, a research facility is likely to create a number of high-paying jobs which would allow the state to collect personal income tax from those positions.

The incentives required to develop a research center, along with the risk of losing property taxes due to a tax exempt status of a potential tenant may reduce the financial benefit to the County to develop a research center at Loudoun Gateway. However a strategic partnership between the County and a University or Foundation which would share the development cost could create a beneficial outcome for the County. Alternatively, if the research center could encourage a University to locate in Loudoun County and generate long-term academic or research uses an initial investment in the research center at the Loudoun Gateway Station could be a good financial investment.

Tech Incubator

Site Compatibility

Tech incubators are typically smaller spaces, such as a small office building or a floor within a building, which is only a fraction of the potential development at the Station Areas. A tech incubator at one of the station areas would likely be one component of office uses as a part of a larger mixed-use development. Historically, tech incubators locate in lower-rent buildings, such as older office buildings and flex space to take advantage of cost savings. Since development at the Station Areas would be new construction, the development of a tech incubator would likely to require a development subsidy from the County to create affordable office space.

Market Support

A location in Loudoun County could leverage the region's highly educated workforce, growing number of millennials, lower prevailing rents and salary requirements than other traditional tech-driven economies, and the second highest pool of tech talent in the nation¹⁰² to create a dynamic and collaborative environment to launch new companies and products. The development of a tech incubator could leverage regional assets, but would likely require the co-location of an established educational or research facility to provide networking support for the startups within the facility. The development of a tech incubator could create critical daytime office workers at the Station Areas as an interim or permanent use as the general office market recovers, and would likely be a relatively small, if important, component of a larger mixed-use development at the Ashburn or Loudoun Gateway station.

¹⁰² CBRE Research, "Scoring Tech Talent, Influencing Innovation, Economic and Real Estate Growth in 50 U.S. Markets" 2015.

During the critical startup phase, new companies seek incubator space that provides a range of technical and financial support including:

- **Collaborative Work Spaces:** Tech startups look for collaborative work environments that foster the exchange of ideas across firms and companies in the space. Typical leases are flexible and allow firms to expand or reduce their office space based on the growth of the firm.
- **Mentorship Opportunities:** Many tech incubators provide a matchmaking role and facilitate introductions between established firms to provide mentorship and guidance as small startups advance through the development of their product.
- **Seed Funding:** Tech incubators typically rely upon public and private funding to support the activities of the incubator, directed towards the needs of various startups. Funding typically covers a portion of the building's cost to enable subsidized rents for startups, provide salaries for incubator staff who manage the space and facilitate networking and mentoring opportunities, and provide seed money for the launch of startups and their products.

Impact of Connection with Silver Line

Public transit accessibility fosters a walkable, mixed-use, higher-density environment that is appealing to millennials. Silver Line access at Loudoun Gateway additionally would enable residents from throughout the northern Virginia and the greater DC region to reach the site, expanding the workforce from which the center could draw job candidates.

Impacts of Dulles Airport

As with the development of a research center, airport proximity for a tech incubator could help to facilitate domestic and global reach. It could help in the formation of business partnerships with companies outside of the DC region, attract and retain staff from elsewhere, as well as make it easier to attract a broad domestic and global audience to events.

Cost-Benefit Analysis

Tech incubators across the country have generated substantial direct economic impacts to the cities, counties, and states in which they are located by creating thousands of jobs and new companies. To provide just one example, Baltimore's Emerging Technology Centers (ETC), with two locations, has created more than 300 companies and 2,300 jobs in the fifteen years of the Centers' operation, all of which are located in Maryland, and half of which are located in Baltimore. Approximately one-third of the ETC's budget in 2013 came from City sources, and the City has justified this investment by noting that for every \$1 of funding, more than \$180 in economic activity has been generated.¹⁰³ Long-term a tech incubator may provide a positive economic benefit for Loudoun County through the generation of new jobs which are likely to locate in Loudoun County or the Commonwealth of Virginia. However, the initial capital and financial support required to support the overhead of the incubator, including office space and technical support would require an upfront contribution by the County and would require several years before any benefit was accrued. If a tech incubator is pursued, the County should consider partnerships with existing tech companies or related industries which may be interested in providing financial support to develop the incubator.

¹⁰³ Wink, Christopher. "What 6 Baltimore tech leaders told a City Council committee." Accessed on June 18, 2015 at: <http://technical.ly/baltimore/2013/09/26/baltimore-city-council-technology-innovation-hearing/>.

Sports and Recreation Facility

Site Compatibility

Several acres of indoor fields and athletic space, with associated outdoor parking could be oriented to work within the confines of the available land at the Loudoun Gateway Station. The development of sports and recreation facility to include outdoor fields, could potentially serve as a symbiotic use for the floodplain, enabling the preservation of permeable land that could easily flood during heavy rainfall events. An indoor sports complex also works within the confines of the LDN 65 noise contours since the roof could reduce the noise impact of flights overhead, and additional noise insulation could be added to further reduce noise impacts. Finally, the relatively simple construction of an indoor sports complex, akin to that of a warehouse, would facilitate the easy redevelopment of the site under different market conditions if an alternative use, such as office, were to emerge.

Market Support

There is evidence of significant market support for a sports and recreation facility in Loudoun County:

- **Growing user group for a sports complex:** The share of youth in the County population has grown, with proportion of residents under 35 having increased by three percent between 2000 and 2013. A regional sports complex could provide a venue for youth sports clubs during weekends, training sports camps in the summer, and adult recreation leagues on evenings and weekends.
- **Soccer and team sports are growing in popularity:** According to the Sporting Goods Manufacturers Association, almost 70% of children (6-17) in the United States are playing at least one team sport¹⁰⁴ and many children participate on multiple sports teams. The popularity of soccer in the United States has grown by almost 3,000% since 1974 when US Youth Soccer had 103,432 participants through 2014 when 3,055,148 children were registered.¹⁰⁵
- **Athletic events create a new demand:** Athletic tournaments and competitions bring competitors and spectators to the area on a regular basis, and the typical tournament athlete brings an additional 2.14 people with them to events.¹⁰⁶ Athletes and spectators generate demand for additional retail, restaurant, hospitality and entertainment uses when they travel, which could be supplied by a sports complex with adjacent retail and entertainment uses.
- **Sporting events bring new visitors to Loudoun County:** Sports tournaments provide a gateway experience for first-time visitors and provide exposure to a place to new visitors who may come back for leisure.

Regionally, several indoor sports complexes are well established and host a range of athletic events including youth and adult leagues.

- **NoVa Field House:** is located in Chantilly, VA and just south of Dulles Airport. The private complex contains two indoor turf fields and a professionally-sized basketball court. Primary uses at the NoVa Field house include: adult basketball; soccer, lacrosse and volleyball leagues; and year-round camps and training facilities for athletes of all ages. The facility also has rentable field space for parties, training, and events.

¹⁰⁴ Avenue ISR. "Game On! The Impact of Youth Sports on a Regional Economy." Sept 18, 2012.

¹⁰⁵ U.S. Youth Soccer. "Key Statistics." Accessed May 11, 2015 at: http://www.usyouthsoccer.org/media_kit/keystatistics/

¹⁰⁶ Avenue ISR. "Game On! The Impact of Youth Sports on a Regional Economy." Sept 18, 2012.

- **Michael & Son Sportsplex at Dulles:** located just north of Dulles Airport, the commercial facility includes three indoor fields and three basketball courts. Programming at the Sportsplex includes youth day camps, youth soccer, basketball, lacrosse and roller hockey leagues, and adult soccer, basketball, inline hockey and football leagues.

To create a competitive anchor at the Station Areas, a sports and recreation facility would have to provide larger facilities than those in the region, and aspire to a semi-professional complex that could capture regional and professional sports uses. However the growing youth and millennial population in the region serves as a potential user base for a new sports facility.

Impact of Connection with Silver Line

As visitors to regional sports facilities often travel with sports equipment to facilities by private car, there is negligible foreseen impact created by a connection with the Silver Line.

Impacts of Dulles Airport

Proximity to the airport may help to attract semi-professional athletes and sports teams outside of the region to consider training and scheduling tournaments at the facility.

Cost-Benefit Analysis

Indoor sports facilities are typically commercially-driven projects; however public-private partnerships have been used to develop larger sports complexes that include several fields and recreational facilities. A public-private partnership enabled the development of the Maryland SoccerPlex and Discovery Sports Center in Germantown, MD, which was developed between the Maryland National-Capital Park and Planning Commission (MNCPPC) and the Maryland Soccer Foundation to develop a sports facility to host regional soccer teams. Since the initial development of the soccer fields, the MNCPPC has developed an indoor Sports Center adjacent to the fields to provide additional recreational uses on-site. While the direct development of the fields and recreational spaces may not generate tax revenues, increased visitors and associated spending at the sports complex may generate a positive financial return for the County. If a private entity is willing to invest the capital for the development and ongoing operations of a sports facility at the Loudoun Gateway Station it may provide a good interim use (20 – 25 years) until market conditions support the development of office or other uses. While a sports-facility may not generate a high financial return in terms of revenue or taxes, it would provide a positive benefit to the community by providing additional recreational spaces and opportunities for residents to exercise and improve their health, or provide an entertainment venue in the region where residents could watch semi-professional games and tournaments.

Professional Sports Stadium

Recent press reports have indicated that Virginia's Governor is interested in luring the Washington Redskins to move to one of Loudoun County's Silver Line stations following the expiration of the team's lease at FedEx field in 2027.

Site Compatibility

A stadium for a professional football team would likely have a capacity of approximately 80,000 seats. Present-day designs are flexible to allow different venues, and from a design standpoint, the stadium itself would require approximately 25 acres in the shape of an oval. Adding ringed parking would

require an additional 125 acres of surface parking if parked at 1 space per 4 seats (20,000 vehicles). Within a half mile of the Metrorail stations there are possible sites at Innovation, Loudoun Gateway and Ashburn. Further investigation is necessary to consider land use requirement and constraints and environmental constraints such as flood plains, steep slopes and airport noise overlay.

The development of a professional sports stadium itself appears to have possibilities at several Station Areas. However the sites become more limited as parking is added, reducing the potential sites large enough for a professional sports stadium and parking within the confines of the station area. Increasing alternative transportation to the stadium through Metrorail and commuter buses could qualify the stadium for credits to reduce the required parking. And the proximity of additional parking lots which could be used on game day may further reduce required parking at the proposed station area. Finally, a structured parking structure, while more expensive to develop than surface parking, would further reduce the area required for parking and increase the number of sites available for a sports stadium. Please see Attachment C-1 and C-2 in the Appendix for siting diagrams for a professional stadium around the Loudoun Gateway Station.

The citing of a professional sports stadium at Loudoun Gateway would likely generate spin-off destination retail which would enhance the game-day experience and provide some activity at the site during non-game days. Typical retail near professional sports stadiums includes sports bars, restaurants, and clothing. However, due to the large development footprint of a professional sports stadium and the associated parking which may require a large portion of available land at the Loudoun Gateway Station a desired planned land use would be difficult to achieve. The County would have to weigh the desire to develop a professional sports stadium against other uses with a higher development density and more constant activity.

Market Support

Market support for a professional football stadium is limited, driven by a team. A potential tenant of a potential stadium in Loudoun County could be the Redskins, currently looking to relocate from their current stadium, FedEx Field in Landover, MD before the expiration of the team's lease in 2027. Daniel Snyder, the Redskin's owner, has expressed an interest in a stadium location that is transit-accessible to increase the ease with which fans can attend games.

A majority of Redskins fans are spread across the region, and the siting of a stadium in Loudoun County would bring fans from Virginia, Maryland, and the District to spend money in Loudoun County. The Redskins Franchise is also familiar with Loudoun County, home to the Redskins corporate headquarters for over 40 years, and with the Redskins Park Training Facility located in Ashburn, Virginia, from 2003 through 2012. The location of restaurants and retail on-site or nearby could create additional economic activity before and after games.

Impact of Connection with Silver Line

While tailgating culture is strong at football games, it is likely that Silver Line access will encourage some fans to travel by train. In 2010, it was estimated that 10,500 fans traveled by NJ Transit to MetLife stadium for NY Jets games, and as fans became more familiar with rail as a travel method to games

ridership levels increased by 70% from 2009 to 2010.¹⁰⁷ However MetLife Stadium has a total capacity of 82,566 seats, and even with 10,500 fans using public transportation to reach games, over 85% of attendees, or roughly 72,000 fans still arrive by car. MetLife Stadium is about 15 minutes from Midtown Manhattan by rail and has only achieved a 12% rail ridership with fans, so it is unclear, if a potential stadium in Loudoun County with a longer ride from the District, could entice fans to attend games by using the Silver Line.

Impacts of Dulles Airport

As Redskins fans are largely from the Washington metropolitan area, no impacts are foreseen by proximity to Dulles Airport, and limited impact from the travel of fans and other football teams at Dulles Airport. From a site compatibility perspective, however, a stadium would be a compatible use, working within airport noise contours.

Cost-Benefit Analysis

As an anchor, a professional sports stadium has the opportunity to create an entertainment and recreation destination for the County that brings thousands of visitors to the area and generates substantial economic impacts in terms of jobs created and dollars spent.

The decision to locate a professional sports stadium is ultimately a political process involving state and local politicians and the owners of the team. In many cases, the ultimate factor in a stadium's location is the willingness of states and municipalities to offer competitive incentive packages to teams. Considering the three most recent NFL stadiums constructed (AT&T Stadium, MetLife Stadium, and Levi's Stadium) each cost over a billion dollars, a financial and incentive package to attract a team would need to be substantial.¹⁰⁸ Developing a stadium would require strong public leadership and likely an investment in infrastructure.

A stadium could generate a number of part-time jobs for maintenance and concession workers at the stadium and income tax for the state, but the largest benefit of a stadium would be intangible benefits of civic pride for the County and State as the home of a national football team. The Commonwealth of Virginia is not home to any professional team, and the relocation of the Washington Redskins from Maryland to Virginia may generate state and local pride which cannot be assigned a financial value. However, the large incentives likely required to develop a stadium and entice a professional team, combined with the relatively low financial returns suggests the County may want to consider alternative development opportunities at the Loudoun Gateway Station unless the State is able to provide a majority of the financing for the stadium.

ASSESSMENT OF COMPATIBILITY WITH COUNTY DEVELOPMENT GOALS

In addition to analyzing the development potential of each catalytic anchor use within the physical and market context of the Loudoun Gateway Station Area, the HR&A Team also evaluated the potential of each anchor use to meet the County's development goals for the Station Area. In October 2013, the Loudoun County Board of Supervisors initiated a Silver Line/Metrorail Tax District Comprehensive Plan

¹⁰⁷ Brennan, John. "Train ridership for football up 50%, but Meadowlands rail use still sparse." *NorthJersey.com*. Accessed on June 18, 2015 at: <http://www.northjersey.com/news/train-ridership-for-football-up-50-but-meadowlands-rail-use-still-sparse-1.936083>.

¹⁰⁸ Stadiums of Pro Football. "NFL Stadium Comparisons – Date Opened." Accessed at: <http://www.stadiumsofprofootball.com/opened.htm>

Amendment to evaluate land uses around the future Metrorail Stations in their ability to achieve the following development goals:

1. Prompt realization of tax revenues to support future Metrorail operations.
2. Maximizing future employment generation.
3. Achieving the desired land use pattern.
4. Minimizing demands on the County's transportation infrastructure.

The HR&A Team assessed the potential development of each catalytic anchor use against each goal, which is summarized in Figure 2-20.

Figure 2-20 : Summary Assessment of Development Potential by Catalytic Anchor Use

| Catalytic Anchor Use | Assessment of Development Potential and Impact on County's Goals |
|---------------------------|---|
| Convention Center & Hotel | <ul style="list-style-type: none"> • Jobs: A convention center & hotel would generate direct jobs in a range of industries, primarily hospitality and retail, but would be an amenity for current and future businesses that could help the County grow, attract and retain additional businesses and jobs. • Taxes: A convention center & hotel would generate tax revenues for the County, including property, sales and hotel taxes (Transient Occupancy Tax). However, some of these tax revenues may need to be re-directed back to the project through a public investment or incentive, as has been the case with other major conference center developments across the United States, including National Harbor. • Land use: A convention center & hotel could be developed in a dense, walkable, urban format that would catalyze additional uses (ancillary retail, entertainment, etc.) • Transportation: A convention center & hotel would leverage the connection to transit and Dulles Airport in particular. • Overall: If the office market does not materialize closer to the time the Station opens, especially within two years after the opening of the Metrorail Station, the HR&A Team suggests that the County consider pursuing a convention center through a partnership with a private developer and with MWAA. This type of development could either be led by the private-sector landowner or potentially by either the County or MWAA. In advance of any commitment to this use the County should require a detailed feasibility study assessing market support as well as fiscal and traffic impacts. This type of development would help partially achieve the County's employment, tax, land use, and transportation goals. |

| Catalytic Anchor Use | Assessment of Development Potential and Impact on County's Goals |
|--|---|
| Destination Retail, Entertainment, & Hotel Use | <ul style="list-style-type: none"> • Jobs: The development of a major destination retail and entertainment center would generate a high number of jobs, but generally in low wage and low skill positions. • Taxes: A destination retail and entertainment center would generate new property taxes for the County at rates comparable to office and residential uses. It would also generate sales taxes [for the State and County]. Precedent destination retail and entertainment centers, such as Mall of America, are privately developed but do require public investment, typically in the form of a partial rebate of on-site sales tax and/or property tax abatement. It may or may not be required for a center at this location. • Land use: A large scale facility could attract other types of development that benefit from proximity to a retail and entertainment anchor (other retail and entertainment uses, hotels, etc.). Depending on the size and parking requirements, there may not be additional space for other development. • Transportation: This type of development would leverage the connection to transit for use by visitors. For example, 11% Mall of America visitors use transit, which is roughly 4.4 million annual visitors. • Overall: If the market for office does not materialize closer to the time the station opens, especially within two years after the opening of the station, the HR&A Team suggests that the County consider the development of a major retail and entertainment use. Ultimately, this type of development would need to be driven by the private-sector landowner, who should commission a detailed feasibility study assessing market support as well as fiscal and traffic impacts. This type of development would help partially achieve the County's employment, tax, land use, and transportation goals. |
| Research Center | <ul style="list-style-type: none"> • Jobs: The development of a research center would create high skill and high wage jobs at densities similar to office uses. • Taxes: A research center may or may not generate tax revenues to the County. It may be tax-exempt if it is anchored by a non-profit university, which is often the case. • Land use: A research center could catalyze additional development over time through expansion, particularly if there is a significant commercialization component that results in the development of new, affiliated companies. It could be developed in a way that is consistent with County policy for a dense, walkable environment at the transit stations. |

| Catalytic Anchor Use | Assessment of Development Potential and Impact on County's Goals |
|----------------------|---|
| | <ul style="list-style-type: none"> • Transportation: A research center would leverage the proximity to transit similar to an office use – it would be an amenity for employees and visitors. • Overall: The attraction of a research center could help brand the Loudoun Gateway Station and create high wage jobs. However, it may be challenging to find an institution to launch such a center given the lack of major research universities in the County and competition from other locations. Attracting this type of user would likely require a significant investment of time and outreach by County staff and could be considered after two years of the station opening if private development has yet to occur at the station area. This type of development would help partially achieve the County's employment, tax, land use, and transportation goals. • |
| Tech Incubator | <ul style="list-style-type: none"> • Jobs: The development of a tech incubator would create high wage, high skill jobs at densities comparable to an office use. An incubator would also build on the County's competitive strengths in tech industries and tech-related jobs in traditional industries, which has grown by 41% over the past 15 years, in contrast to decline in many other suburban counties in the Washington region.¹⁰⁹ • Taxes: If it is operated by the private sector, it would generate property tax revenues comparable to an office use. If it is operated by a non-profit institution, it may be tax-exempt. • Land use: Similar to a research center, a tech incubator could help brand the Loudoun Gateway Station, attract other uses, and support additional development over time. Since tech incubators are typically small and look for low-cost facilities, it is unlikely that it would catalyze substantial new development immediately and may require public investment to open. It could be developed in a way that is fosters a dense, walkable environment at the transit stations. • Transportation: A tech incubator would leverage the proximity to transit similar to an office use – it would be an amenity for employees and visitors. • Overall: The attraction of a tech incubator could help brand the Loudoun Gateway Station and create high wage jobs. However, most incubators are relatively small and low-cost office space users, and it will take years to realize the spinoff effects. This type of development would help partially achieve the County's employment, tax revenue, land use, and transportation goals. |

























¹⁰⁹ HR&A analysis with EMSI data.

| Catalytic Anchor Use | Assessment of Development Potential and Impact on County's Goals |
|------------------------------|---|
| Sports & Recreation Facility | <ul style="list-style-type: none"> • Jobs: A sports and recreation facility would generate limited employment opportunities. • Taxes: The HR&A Team recommends that the County only consider this type of use if it is privately developed and taxed at rates of comparable facilities. The County has made substantial investments in new community recreational facilities over the past few years and the development of a facility on this site should complement and not compete with county-owned facilities. The tax revenues would likely be comparable to an industrial use. • Land use: This type of use would likely not be consistent with the County's aspirations for a dense, walkable urban environment at the transit stations. It would be, however, compatible with Dulles Airport. • Transportation: This use would likely leverage access to transit at lower rates than an office or retail uses and, thus, would still require a significant amount of parking. • Overall: This type of development would only minimally achieve the County's employment, tax revenue, land use, and transportation goals. |
| Professional Sports Stadium | <ul style="list-style-type: none"> • Jobs: A professional sports stadium would mainly generate low wage, part-time employment. • Taxes: A professional sports stadium would likely require a major investment from Loudoun County and/or the Commonwealth of Virginia. • Land use: The amount of space required for a professional sports stadium and parking would prevent the development of other ancillary uses in line with the County's plan policy for a dense, walkable environment around the station. A football stadium in particular would require significant surface parking to promote the team's desired game-day experience (e.g. tailgating). The use would be compatible with Dulles Airport. • Transportation: This use would leverage connection with transit similar to existing suburban professional sports stadiums, where for example 12% of fans, or roughly 10,500 fans per game, use transit to get to Met Life Stadium in New Jersey. However, the capacity for ridership would not be significant enough to reduce the need for parking. • Overall: While a professional sports stadium at Loudoun Gateway would establish a brand for the station area, it is unlikely to achieve the County's employment, tax revenue, land use, or transportation goals. If another party proposes a professional sports stadium for this location, the County should require a detailed feasibility study that includes conceptual site plan, economic and fiscal impacts, and transportation impacts. |

Section 2: Regional Real Estate Market Analysis

Based on the detailed table above, the following table provides a summary of the HR&A Team's assessment of each catalytic anchor use and its alignment with the County's development goals. A relative scale of "High," "Medium," and "Low," provides a high-level synopsis of the Team's assessment.

Figure 2-21: Evaluation of Catalytic Anchor Use as Related to County Development Goals

| | Job Creation | Tax Revenue Generation | Land Use | Transportation |
|---|---|---|---|---|
| Convention Center & Hotel |  |  |  |  |
| Destination Retail, Entertainment & Hotel |  |  |  |  |
| Research Center |  |  |  |  |
| Tech Incubator |  |  |  |  |
| Sports & Recreation Facility |  |  |  |  |
| Professional Sports Stadium |  |  |  |  |

Legend:  High  Medium  Low

VIII. CONCLUSIONS: OUTLOOK FOR NON-RESIDENTIAL DEVELOPMENT

Based on the team's market research and scan of trends in airport-adjacent development at global airports, the HR&A Team reached the following conclusions about the outlook for non-residential development in the station areas:

- ***The demographic and economic conditions in Loudoun County are highly favorable to continued growth.*** Loudoun County benefits from a highly educated workforce, excellent infrastructure, and a high quality of life that will continue to make it attractive to businesses looking to expand in the region. Building on these already strong fundamentals, the opening of the two Silver Line stations will provide a new and convenient link to regional employment centers, workforce and Dulles International Airport that will only enhance the eastern portion of the County's status as a desirable place to locate a business.
- ***The weak regional office market has not yet supported new commercial development around the Silver Line stations, but, several factors make these locations attractive for future commercial uses in the future.*** These factors include:
 - The growing preference for transit-accessible office locations around the region, demonstrated by the stronger performance of office markets near Metrorail stations compared to suburban auto-oriented locations, and announcements by major tenants, such as Marriott, that they are looking to relocate to rail-accessible locations.
 - The availability of large parcels of underutilized land for new development. It is easier to redevelop a primarily vacant property on a large parcel compared with an infill site or a partially vacant property on a smaller parcel, as is the case in Tysons Corner. The large parcels in the Loudoun station areas provide an opportunity for phased and coordinated development that can create a more attractive sense of place if planned with features that encourage walkability, easy access to Metrorail, and attractive amenities.
 - The close proximity to Dulles Airport. Industries requiring frequent travel or transport of goods will always have a preference to locate near the airport. While demand from these uses is unlikely to support the complete build out of the station areas, it is one positive market factor.
- ***The expected arrival of the Metrorail's Silver Line to the County by 2020 will make office leasing at the Station Areas and the County more regionally competitive.*** In the past 15 years, Loudoun County has captured 27% of the overall office absorption in Northern Virginia. The HR&A Team estimates the County's overall office absorption relative to Northern Virginia could increase to 35% due to the County's attractiveness as a place to live, work, and do business, and enhanced transit-access via Metrorail. It is likely the Station Areas will be the most competitive destinations for new office tenants, and could capture up to 40% of new office absorption in Loudoun County through 2040. As a more competitive and desirable office destination, the Team's estimates indicate the Station Areas in Loudoun County could approximately capture a cumulative 9 million square feet of net office absorption by 2040.
- ***Developers and tenants will need to be confident about the Silver Line opening date before they will be willing to invest and start new construction around the stations.*** Phase 2 of the Silver Line, including the Dulles Airport and Loudoun County Stations, was recently delayed until 2020. Based on development experience at other regional Metrorail stations and especially since Metrorail is entirely new to Loudoun County, it is unlikely that new transit-oriented office investment will occur until there is certainty of the opening date, and possibly not until operations begin. To support new development, the station areas will have to be competitive with other station areas in terms of

pricing, product type, and sense of place and offer pricing competitive to cheaper, auto-dependent suburban locations, which currently have high vacancy rates and are actively repositioning to attract new tenants. In the meantime, interim uses could generate positive revenues to property owners and the County until the regional market strengthens. Interim uses can range in scale and tenure from one-off “pop up” uses (e.g., festival, beer garden, major outdoor event space) to longer term uses with an eventual plan for redevelopment (e.g., big box retail with a 20 year pad lease or regional sports and recreation facilities).

- ***The development of an anchor use at the Loudoun Gateway station could help accelerate other types of development, but, it would likely require a public-private partnership with Loudoun County.*** Most anchor uses reviewed by the team, such as conference facilities, sports facilities, and destination retail/entertainment, required some level of public investment due to the scale and level of developer returns. Depending on the type of use and amount of space it occupies, these uses do generate value to the station areas by attracting additional development, generating jobs, and branding the location. The development of an anchor use will require a public policy decision by the County, and also possibly the Commonwealth of Virginia, that the anchor is critical to larger economic development objectives. These niche anchor uses, as opposed to more standard office and residential development, are rarely purely market-driven developments. However, before engaging in any partnerships to encourage the development of a catalytic anchor use, the County should wait two years after the opening of the Metrorail Station to allow the private market adequate opportunities for development. If private development has yet to occur the County should consider a partnership with a private developer or additional private entity to pursue a catalytic anchor use.

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Section 3: Key Trends in Airport-Adjacent Development

I. INTRODUCTION

The HR&A Team conducted an in-depth analysis of six airport regions (international and within the United States) to identify best practices and land use trends that could offer lessons learned for development at the Loudoun Gateway and Ashburn Metrorail stations in Loudoun County. The Team's trend analysis conducted as part of Section 2 indicated that airport regions typically have been able to develop and maintain logistics, office, hotel, retail and exhibition/conference/training center development uses either at the airport or on adjacent lands. These non-aviation land uses often draw on the airport as a catalyst for demand and as a means to attract business associated directly and indirectly with aviation-related activities. These areas directly benefit the airport; its passengers and employees, the airlines, carriers, and businesses that operate at the airport; as well as adjacent communities by providing employment and promoting economic development.

The results of the analysis in Section 2 led to the identification of six airport-regions where land use development and related policies are considered best practices in the way they have capitalized on airport proximity. These airports represent a globally competitive set of destinations for cargo and passenger volume, especially in the United States where Dulles Airport is in direct competition with other U.S. airports to attract business to locate on airport-owned land or in close proximity to the airport. This section provides further analysis and a detailed description of successful and varied developments in the six airport regions that could be relevant to potential developments in and around the new Silver Line Metrorail Stations in Loudoun County. The Team's analysis also included any apparent impact of rail service and how airport proximity has influenced land uses.

The six airport-regions selected were at the following airports:

- Dallas/Fort Worth International Airport (DFW);
- Denver International Airport (DEN);
- Minneapolis-Saint Paul (MSP);
- Frankfurt International Airport (FRA);
- Singapore/Changi International Airport (SIN); and
- Kuala Lumpur International (KLA).

As discussed in Section 2, DFW, MSP, FRA, SIN and KLA airport-regions all exhibited similarities, especially with regards to transit connectivity and mixed-use developments proximate to the airports, including hospitality, office, logistics clusters, and retail uses. While all airports had mixed-use development, all of the airport operators actively sought to limit residential development within the flight paths to avoid compatibility issues. As one of the newest airports in the six regions, DEN does not yet exhibit the level of development intensity as its peers, but the airport and neighboring county and cities are preparing for major growth in conjunction with a soon-to-arrive rail link to the City of Denver.

Figure 3-1: Statistics on Airport Operations presents a comparison of key elements that provide additional information for each airport and Dulles International Airport.

Figure 3-1: Statistics on Airport Operations

| Airport | Year Opened | Owner/ Operator | Terminals/ Runways | Land Area (Sq. Miles) | Number of Passenger Airlines | 2014 Total Passengers (Millions) | 2014 Total Cargo (Million Tons) |
|----------------|------------------------|---|-------------------------------|----------------------------------|---|---|--|
| IAD | 1962 | Metropolitan Washington Airport Authority | 5/4 | 18.5 | 36 | 21.6 | 0.27 |
| DFW | 1974 | Cities of Dallas and Fort Worth/DFW Airport Group | 5/7 | 26.9 | 27 | 63.6 | 0.70 |
| DEN | 1995 | Denver Department of Aviation | 4/6 | 54.1 | 15 | 53.5 | .260 |
| MSP | 1923 | Metropolitan Airports Commission | 2/4 | 5.3 | 18 | 35.2 | .157 |
| FRA | 1936 | Fraport AG | 2/4 | 7.7 | 98 | 59.6 | 2.16 |
| SIN | 1981 | Singapore/Changi Airport Group | 3/2 | 5 | 71 | 54.1 | 1.98 |
| KUL | 1998 | Malaysia/Malaysia Airport Holdings Berhad (MAHB) | 3/3 | 39 | 56 | 48.9 | 0.85 |

Section 3 is organized to provide an overview of the Team's key findings as they relate to:

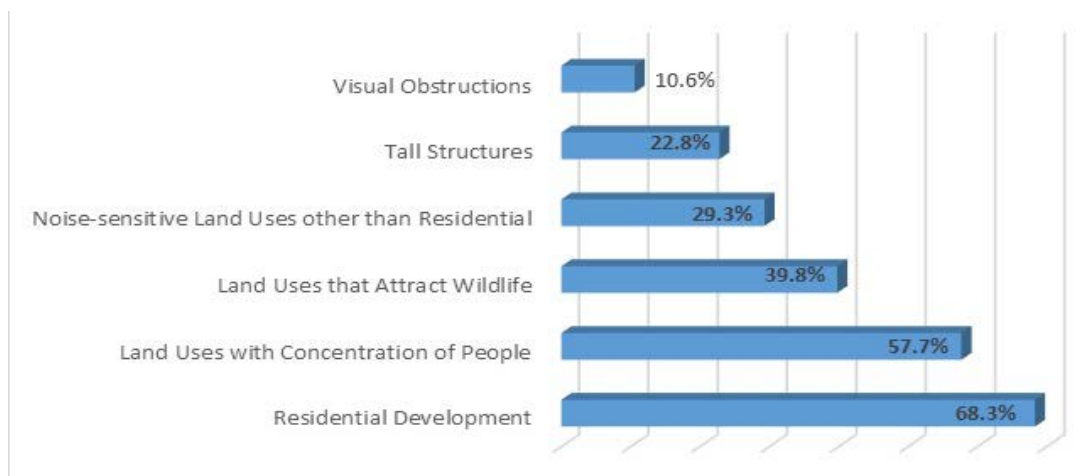
- Land Use Planning Around Airports, with special consideration given to incompatible land uses and the impact of aircraft noise on land use decisions.
- Case Studies of Compatible Airport Adjacency where the Team reviewed the six airport-regions for development patterns, the influence of rail on development, policy actions taken by the airports and municipalities and an overview of the airport's economic impacts.
- Conclusions from the Team's analysis.

II. LAND USE PLANNING AROUND AIRPORTS

Land use planning around airports has been a topic of discussion ever since airports were built. Numerous research studies and work has been done on the topic since the 1950s with the objective of recommending compatible land uses that consider the airport environment. Airport-compatible land uses are those uses that because of their nature can coexist with a nearby airport without exposing people living and working in close proximity to the airport to unacceptable levels of noise or hazards, or constraining the safe and efficient operation of the airport. The level of compatibility of land uses around an airport is greatly influenced by many factors including the type of land use, levels of risk acceptable to the communities, operating procedures of aircraft operators and regulatory public agencies, and cultural and social issues. As a result of the influence of these factors, the determination of what is compatible is somewhat specific to the individual communities and their neighboring airport.

Historically the single most used factor to determine compatibility of lands adjacent or in close proximity to an airport, has been the levels of noise exposure. Other popular elements considered when determining compatibility of land use focus on activities that could be hazardous to aircraft operations, such as: the height of manmade structures or tall natural obstructions on the property; the propensity of the type of use to attract wildlife that could interfere with flight operations; and operations that generate large amounts of smoke and warm air plumes or flying debris such as rock quarries or fire ranges. A survey conducted in 2007 by National Association of State Aviation Officials (NASAO) identified the incidence of incompatible land uses around airports and the effect on the operation of those airports shown in Figure 3-2.¹ Results below generally confirm these arguments with the inclusion of land uses with a high concentration of people as the second highest incidence of land incompatibility.

Figure 3-2: Incidence of Incompatible Land Uses around Airports



Source: National Association of State Aviation Officials (NASAO)

¹ ACRP Report 27 Enhancing Airport Land Use Compatibility.

COMPATIBILITY REGARDING AIRCRAFT ACCIDENTS AND SAFETY CONCERNS

Even though aircraft accidents in close proximity to airports are rare, prudent policies of maintaining compatible land uses around airports and under flight paths would reduce the risk to those on the ground and those traveling by air should an accident occur. Various studies have been conducted in the U.S. by the National Transportation Safety Board (NTSB) in an effort to establish risk zones associated with runway ends by assessing trends in aircraft accident locations. The establishment of criteria limiting the maximum number of dwellings or people in areas close to the airport is the most direct method of reducing the potential severity of an aircraft accident.

The United Kingdom and the Netherlands have increasingly been performing risk analyses in developing land use compatibility guidance. The results of these European studies, along with a study conducted in the United States for the Wold Chamberlain Joint Airport Zoning Board in Minneapolis, suggest that current airport land use compatibility criteria may overstate the risk to people and property on the ground.

Some jurisdictions around the U.S. including California, Minnesota, Washington State, and others have adopted some form of density regulation on the type of developments allowed within the various airport safety zones. Definition of these zones varies among the regulations studied, but all are associated with the height and distance of aircraft from the runway ends and/or associated with the imaginary approach and departure surfaces² as described in FAA standards and regulations.

Certain types of land uses pose higher risks to people on the ground and should generally be avoided under approach paths near the ends of runway regardless of the number of people on the site. These include uses in which the mobility of occupants is limited, such as schools, hospitals, clinics, nursing homes, etc. Other uses to be avoided include critical community infrastructure which if damaged could cause significant adverse effects to public health and welfare, such as power plants, electrical substations, public communications facilities and other facilities. Lastly, above ground storage of large quantities of materials that are highly flammable or otherwise hazardous (explosive, corrosive, or toxic etc.) that would increase risks if involved in an aircraft accident are generally incompatible with airports and areas close to runway ends.

AIRCRAFT NOISE AND LAND USE COMPATIBILITY

Multiple studies indicate that high levels of aircraft noise have the potential to affect the health of exposed populations as well as negatively impact quality of life in communities surrounding airports. To date, noise is a leading cause of community opposition to airport expansion and this opposition is intensified when incompatible land uses result in increased residential density around airports. A 1993 World Health Organization (WHO) report entitled “Community Noise,” and other similar studies found that constant exposure to noise gives rise to a number of non-auditory health problems, ranging from insomnia, stress, mental disorders, hypertension, and negative impacts to attention spans and long-term and working memory on children. These results have been replicated in other similar

² Airport Land Use Compatibility Manual 2006, Minnesota Department of Transportation

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studies.³ However, the more severe of these adverse health effects have not been demonstrated to occur at noise levels typically experienced around airports.

It is important for communities to address incompatible land use that are related to noise, even if the impacts are only perceived by local residents. This practice avoids the common opposition to airport development and is also important for property values and quality of life. The Federal Aviation Administration has set guidelines regarding noise levels and compatible land use. Please see Figure 3-3 for a copy of the FAA's noise guidelines.

In 1979, the United States Congress passed the Aviation Safety and Noise Abatement Act. The Act required the Federal Aviation Administration (FAA) to develop a single methodology for measuring and determining airport noise impacts caused by aircraft operations. In January 1985 the FAA formally implemented the Day-Night Average Sound Level (DNL)⁴ as the noise metric descriptor of choice for determining long-term community noise exposure in the airport noise compatibility planning provisions of 14 C.F.R. Part 150. Additionally, FAA Order 1050.1, "Environmental Impacts: Policies and Procedures" and FAA Order 5050.4, "National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions," outlines DNL as the noise metric for measuring and analyzing aircraft noise impacts. As detailed above, the FAA requires the DNL noise metric to determine and analyze noise exposure and aid in the determination of aircraft noise and land use compatibility issues around United States airports. Because the DNL metric correlates well with the degree of community annoyance from aircraft noise, the DNL has been formally adopted by other federal agencies such as the Environmental Protection Agency, Department of Defense, Department of Housing and Urban Development, and the Veterans Administration when dealing with noise exposure.

The DNL metric is calculated by cumulatively averaging sound levels over a 24-hour period. This average cumulative sound exposure includes the application of a 10-decibel penalty to sound exposures occurring during the nighttime hours (10:00 p.m. to 7:00 a.m.). Since the ambient, or background, noise levels usually decrease at night the night sound exposures are increased by 10 decibels because nighttime noise is more intrusive.

The FAA considers the 65 DNL contour line to be the threshold of significance for noise impact. As such, sensitive land use areas (e.g., residential) around airports that are located in the 65 or greater DNL contours are considered by the FAA as incompatible structures. However, the FAA's guidelines are clear that they are not intended to substitute land uses determined by local authorities to be appropriate for locally-determined needs and values in achieving noise compatible land uses. Consistent with FAA guidance, several states and U.S. and foreign jurisdictions have adopted even stricter noise constraint levels for the development of residential communities considering the

³ The effects of chronic aircraft noise exposure on children's cognition and health: 3 field studies. Matheson MP1, Stansfeld SA, Haines MM.

⁴ The Loudoun County Airport Impact (AI) Overlay District zoning ordinance uses the acronym LDN to refer to noise level categories. According to the Zoning Code Section 4-1400 AI-Airport Impact Overlay District, subsection 4-1406 Definitions (A) Ldn: The symbol for "yearly day-night average sound level", which means the 365-day average, in decibels, for the period from midnight to midnight, obtained after the addition of ten decibels to sound levels for the periods between 10 p.m. and 7 a.m., local time. The Federal Aviation Administration uses the acronym DNL (Day-Night Average Sound Level) to refer to the same noise categories. This report uses LDN when referring to the Loudoun County AI Overlay District zoning ordinance and DNL when referring to FAA rules.

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variability and precision of noise impact contours. A survey conducted at 35 airports nationwide indicated that 57% of the airports surveyed reported having land use compatibility measures that apply to lands outside the 65 DNL and 15% provide noise insulation within the 60 DNL contour.⁵

Figure 3-3: FAA Aircraft Noise and Land Use Compatibility Guidelines

| Land Use | DNL Contour Interval (dB) | | | | | |
|---|---------------------------|-------|-------|-------|-------|-----------------|
| | Less than 65 | 65-69 | 70-74 | 75-79 | 80-84 | Greater than 85 |
| <i>Residential</i> | | | | | | |
| Residential, other than mobile homes and transient lodgings | Y | N(1) | N(1) | N | N | N |
| Mobile home park, | Y | N | N | N | N | N |
| Transient Lodgings | Y | N(1) | N(1) | N(1) | N | N |
| <i>Public Use</i> | | | | | | |
| Schools | Y | N(1) | N(1) | N | N | N |
| Hospitals and nursing homes | Y | 25 | 30 | N | N | N |
| Churches, auditoriums, and concert halls | Y | 25 | 30 | N | N | N |
| Governmental services | Y | Y | 25 | 30 | N | N |
| Transportation | Y | Y | Y(2) | Y(3) | Y(4) | Y(4) |
| Parking | Y | Y | Y(2) | Y(3) | Y(4) | Y |
| <i>Commercial Use</i> | | | | | | |
| Offices, business and professional | Y | Y | 25 | 30 | N | N |
| Wholesale and retail-building materials, | | | | | | |
| Hardware and farm equipment | Y | Y | Y(2) | Y(3) | Y(4) | N |
| Retail trade-general | Y | Y | 25 | 30 | N | N |
| Utilities | Y | Y | Y(2) | Y(3) | Y(4) | N |
| Communication | Y | Y | 25 | 30 | N | N |
| <i>Manufacturing and Production</i> | | | | | | |
| Manufacturing, general | Y | Y | Y(2) | Y(3) | Y(4) | N |
| Photographic and optical | Y | Y | 25 | 30 | N | N |
| Agriculture (except livestock) and forestry | Y | Y(6) | Y(7) | Y(8) | Y(8) | Y(8) |
| Livestock farming and breeding | Y | Y(6) | Y(7) | N | N | N |
| Mining and fishing, resource | | | | | | |
| Production and extraction | Y | Y | Y | Y | Y | Y |
| <i>Recreational</i> | | | | | | |
| Outdoor sports arenas and spectator sports | Y | Y(5) | Y(5) | N | N | N |
| Outdoor music shells, amphitheaters | Y | N | N | N | N | N |
| Nature exhibits and zoos | Y | Y | N | N | N | N |
| Amusements, parks, resorts and camps | Y | Y | Y | N | N | N |
| Golf courses, riding stables, and water | | | | | | |

⁵ ACRP Synthesis 16 "Compilation of Noise Programs in Areas Outside DNL 65", Transportation Research Board 2009

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| | |
|---------------|--|
| SLUCM | Standard Land Use Coding Manual. |
| Y(Yes) | Land use and related structures compatible without restrictions |
| N(No) | Land use and related structures are not compatible and should be prohibited |
| NLR | Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure. |
| 25, 30, or 35 | Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structure |

Notes: The designations contained in this table do not constitute a federal determination that any use of land covered by any noise mitigation program is acceptable or unacceptable under federal, state, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under its Airport Noise Compatibility Planning Part 150 recommendations discussed above are not intended to substitute for locally determined land uses as established by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

- (1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.
- (2) Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
- (3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
- (4) Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
- (5) Land use compatible provided special sound reinforcement systems are installed.
- (6) Residential buildings require an NLR of 25.
- (7) Residential buildings require an NLR of 30.
- (8) Residential buildings not permitted.

III. CASE STUDIES OF COMPATIBLE AIRPORT ADJACENCY

The following pages describe various aspects associated with each of the six airport-regions studied. The purpose of this section of the report is to identify the successes and challenges in land use compatibility that have been observed at each airport-region and to present the range of development opportunities available in areas near the future WMATA Silver Line Metrorail Stations. The interaction between airport operations, transit connectivity, and successful land uses is of particular import. Where available, this study also documents master planning and land use policies (developed by both the airport operator and the surrounding municipalities) that support and capitalize upon airport proximity to catalyze the appropriate development density and type. The case studies further assess the extent to which passenger rail and transit service have influenced airport-adjacent development, and explore the extent to which airport proximity has enabled certain land uses to capitalize on close links to national and international trade. Specifically, the case studies present:

- Further details of each airport and their land development programs including total available land, amount of land that has been commercially developed, and primary uses.
- Historic, current, and planned land development activity and compatibility with airport operations.
- Impact of rail access.
- Availability of residential and hospitality land uses.
- Impact of airport proximity, and interactions between the airport and surrounding municipalities.
- The role of the airport as a driver of adjacent development and the economic impacts of ongoing airport operations.⁶

⁶ Note the team did not find any research detailing the economic impacts of individual airport-affiliated projects and thus the economic impacts analysis focuses on the airports.

DALLAS/FORT WORTH INTERNATIONAL AIRPORT (DFW)

Dallas/Fort Worth International Airport is located approximately 25 minutes outside of downtown Dallas and first opened in 1974. As of 2014, the airport had seven runways, five terminals, and occupied 26.9 square miles of land. In 2014, the Airports Council International (ACI) ranked DFW 9th in total passenger traffic worldwide, serving 63.6 million passengers and shipping just over 700,000 tons of cargo. In 2005, DFW invested in major airport improvements including the opening of an international terminal and people mover system. The airport is currently renovating all four original terminals, a \$1.29 billion initiative with an expected completion by 2018.

Landside Development Activity

DFW consists of 12,000 acres of land dedicated to airport operations and an additional 6,600 acres (approximate) of land designated for commercial development. A land use plan for DFW targets the development of multifaceted commerce centers to enhance DFW's competitiveness in the global travel market. With this objective, the airport recently completed a comprehensive land use plan for the 6,600 acres of developable land surrounding the airport to create an Airport City, and establish DFW as a regional center of commerce. Highlights of DFW's existing and planned development initiatives which are most relevant to the study are described below and also shown in relation to the airport and rail transit in Figure 3-4.

Figure 3-4: Dallas-Fort Worth International Airport, Surrounding Development, and Rail Transit



Source: Google Maps, Kimley-Horn, and HR&A Advisors

1. International Commerce Park

- A 376 acre master-planned logistics park at DFW Airport, strategically designed for industrial/warehouse and logistics businesses.
- Located in a Foreign Trade Zone (FTZ), with imports and exports to facilitate the development of international trade and air freight logistics, and expand world air cargo growth.
- Formal guidelines for construction, architectural design elements, environmental sustainability, and aesthetic landscaping programs are enforced to preserve the premier character, integrity and quality of the development.
- As of January 2015, all 376 developable acres were successfully leased.
- A 630,800 square foot speculative building in the Park, received recognition as the “Best New Industrial Land Development” deal by the Dallas Business Journal and the Logistics Center I, a 1,053,365 square-foot cross-dock facility was identified as the largest non-terminal facility ever built at the airport.
- The development has generated 3,219 jobs and \$329 million contribution to the local economy.

2. Southgate Plaza

- A 32-acre development to include hospitality, retail, office, and restaurant land uses
- The initial anchor development was the 150,000 square foot corporate headquarters for the airport, with capacity for 525 employees and was completed in May 2015 at a cost of \$54 million.
- The second development anchor in Southgate Plaza is a 137-room Hyatt Place Hotel, owned by the airport and operated by Woodbine Development Corporation. The hotel has an estimated completion date of November 2015.
- Plans for Southgate also include a 6,000 square foot U.S. Postal Service retail center, an additional five pad sites for retail/restaurant land uses, and two pad sites for office and additional hospitality.
- Bus transit will be available to provide access to terminals and the regional rail station from Southgate.
- Full development of Southgate Plaza could provide accommodations and amenities for the more than 165,000 daily airline passengers and 122,000 daytime DFW employees.⁷

3. Paradise 4 Paws Pet Hotel

- Opened in early 2013, this 25,000 square foot “resort” for animals offers a convenient solution for travelers with pets. The facility is open 24 hours a day and offers numerous amenities including overnight and daycare, on-site veterinary assistants, grooming and spa services, obedience training, and indoor and outdoor grass play areas.
- Owners can check on their pets via webcam in real time and may park their vehicles at the pet hotel for a daily fee and use a shuttle to the airport.
- Paradise 4 Paws operates additional locations at O’Hare and Midway airports in Chicago as well as at Denver International Airport, the newest of which opened in December 2014.

⁷ Dallas/Fort Worth International Airport. “Landhere, Southgate Plaza.” Accessed on June 23, 2015.

4. Irving Convention Center

- Opened in January 2011 at a cost of \$133 million⁸, the Irving Convention Center houses 275,000 square feet of meeting and event space. This includes a 50,000 square foot exhibit hall, a 20,000 square foot grand ballroom, multiple small meeting rooms, a formal boardroom, and outdoor terraces.
- The Center caters to events such as conventions, meetings, weddings and wedding receptions, and other social events. Catering service is available.
- Patrons can reach the convention center by bus (arriving at 30 minute peak hour headways and 60 minute off-peak) or by light rail (though it is necessary to take a taxi from the station to the center). There is also an 800-space parking garage on site.
- The City of Irving financed the construction of the convention center through bond financing and pledged a 2% hotel occupancy tax for the debt service payment. However, the national recession of 2007-2009 decreased total hotel bookings in the City, and in 2010 the Irving Visitors Bureau had to use emergency funds to cover a revenue gap for the convention center's debt service.⁹ While facing initial economic challenges, by the fifth year of operations the Convention Center is expected to have created 730 new jobs and \$1.5 million in sales taxes for the City.¹⁰
- Hoping to leverage the initial convention center as an anchor for a larger entertainment district, the City of Irving has tried since 2012 to develop an entertainment center adjacent to the convention center. However, the City's previous challenges meeting the convention center's debt service in 2010 created local opposition towards the City taking on additional debt to finance an entertainment center. In 2012, the City was willing to issue \$250 million in bonds to finance the entertainment center but delays in the bond rating by S&P ultimately led the financing plan to fall apart.¹¹ In 2014, the City was able to enter into a development agreement with ARK Group to develop the entertainment district; at 18 acres the total development is estimated to cost \$160 million and include the Irving Music Factory, an Alamo Drafthouse movie theater, a city-owned hotel and the development of a tax-free office building.¹² The City is funding \$84 million of the project with public funds through taxes and economic incentives for developers.¹³

5. Bear Creek Office Park

- 1,800 acres in the southwest corner of the airport property.
- Marketed towards corporate tenants desiring close access to the airport and regional connectivity via the nearby state highways.
- As of yet, no properties have been developed at this location apart from two 18-hole golf courses.

⁸ Munsil, Leigh. "New Las Colinas convention center could make Irving more than a business destination." The Dallas Morning News, Nov 26, 2010.

⁹ Munsil, Leigh. "New Las Colinas convention center could make Irving more than a business destination." The Dallas Morning News, Nov 26, 2010.

¹⁰ Munsil, Leigh. "New Las Colinas convention center could make Irving more than a business destination." The Dallas Morning News, Nov 26, 2010.

¹¹ Starkey, John. "Irving Convention Center to Finally Get Entertainment Center, Hotel after Years of Delays." Rambler Newspapers. Jul 9, 2014.

¹² Selk, Avi. "After Years of Delays, Irving Entertainment Center Ready to Party." The Dallas Morning News, Aug 29, 2014.

¹³ Starkey, John. "Irving Convention Center to Finally Get Entertainment Center, Hotel after Years of Delays." Rambler Newspapers. Jul 9, 2014.

Residential Development

To protect ongoing airport-operations, land owned by DFW is only zoned for commercial development. However, communities just beyond the airport's borders and outside of the FAA's 65 DNL noise contours are zoned residential and are popular residential areas. Residents may still be subjected to high levels of noise from DFW, which historically was a source of tension between residents and DFW. Aware of the impact that incompatible residential uses can have on the quality of life for residents and on airport operations, DFW has taken a proactive approach to managing residential development by seeking to preserve strong relationships with residents and adjacent cities. For instance, DFW sends representatives to public meetings concerning the development of new homes close to the airport's borders that may be subject to high levels of noise to remain an active partner in the process and represent the airport's interests in the development process.

Despite concerns over incompatible land uses, pressure from land owners and developers for incompatible development – in particular residential uses - in restricted development areas has been a challenge. Local governments and the airport have had mixed results balancing these development requests. In early 2013, both the Irving City Council and DFW jointly opposed a rezoning request of industrial land which would have allowed residential developments in close proximity to one of the Airport's runways, in an area that is between the 65- 60 DNL. By August 2013, despite DFW protests, the City of Irving changed its stance and approved the rezoning to permit 669 single family homes to be built 600 feet northeast of runway 13L-31R, slightly outside of the direct flight path. To mitigate potential residential complaints, the approval adhered to recommendations from DFW to require 25 decibel noise attenuation to all parcels, an aviation easement on each lot, and full disclosure to potential home buyers of airport noise impacts. The project is currently under construction, approximately 70% of the project has been completed.

Rail Access

To Dallas

The DFW Station is located at the end of the Dallas Area Rapid Transit (DART) Orange Line which opened on August 18, 2014. Rail passengers can reach downtown Dallas in 50-60 minutes from the airport between 3:50 AM and 1:00 AM. While there is no discernable trend in air passenger volumes as a result of the new station, the average weekday DART ridership at the DFW Station in 2014 was 922 passengers, the average Saturday ridership was 785 passengers, and the average Sunday ridership was 783 passengers. This equates to roughly 320,000 people per year travelling to and from the airport station via DART.

To Fort Worth

In 2009, the Fort Worth Transportation Authority carried out a study to identify the TOD framework options for a new DFW Airport-North Station. The station at DFW would be one of ten new commuter rail stations as part of a 37 mile rail expansion connecting DFW to the southwest and the City of Fort Worth. The commuter line is expected to be completed by 2018. The study indicated the DFW Airport-North Station would have a positive impact on the development of more than 1,100 acres of undeveloped land around the station. Development plans at the station included a mix of hospitality, entertainment, and related commercial uses, as well as a mix of retail, office, and restaurants in the station area, but excludes any residential development.¹⁴

¹⁴ Dallas/Fort Worth Airport, "Station Area Plan DFW Airport-North." February 2009.

Section 3: Key Trends in Airport-Adjacent Development

The study states a number of opportunities and constraints associated with development of the 1,100 acres around the DFW Airport-North Station. Among the most important opportunities listed are:

- The station site is located within land considered to be one of the most desirable pieces of property in north Texas. The station area is centrally located within the Metroplex and will have good regional highway access, with plans for seven to eight vehicular access points.
- The area north of the station is considered the airport's "crown jewel", where DFW is planning to locate higher-end commercial mixed-uses which could benefit from direct connection to the airport terminal area.
- The station area may be a good candidate for the development of a corporate center. Global companies in need of business or conference facilities might be drawn to this location due to its easy rail access to the airport and other destinations within the Metroplex.

Among the major constraints listed are:

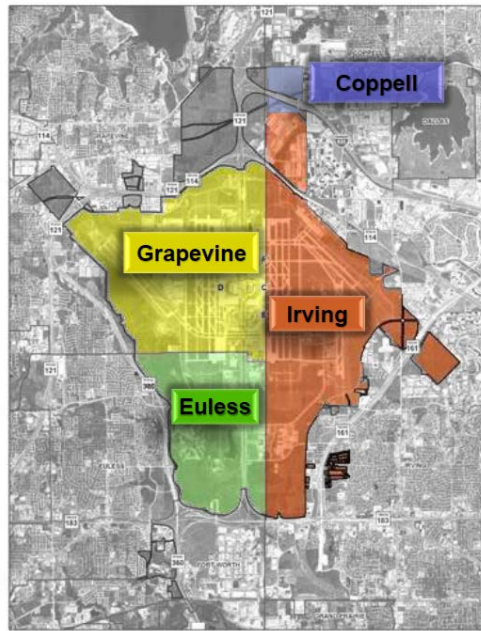
- DFW's Land Leasing Policy dictates that the airport should not compete for the same economic development opportunities as its Owner Cities, which could impact the size and type of development.
- As the area around the station is located in the flight path of the airport, residential development is limited in most areas, if not prohibited.

The DFW Airport North Station would be under the flight path of aircraft landing or taking-off from DFW's Runway 18R/36L and would be approximately 6,600 feet from the end of the 18R runway. In comparison, the new Loudoun Gateway/606 Metrorail station close to Dulles Airport is approximately 9,200 feet from the end of the 19R runway. Since DFW owns all of the land within a half-mile around the station, it has much better control on the type of uses it will allow to be developed around the station. MWAA only controls about half of the land around the Loudoun Gateway/606 Station and will therefore have to work collaboratively with Loudoun County and private developers to manage the types of uses developed around the station.

Policy Actions

Dallas/Fort Worth International Airport is jointly owned by the cities of Dallas and Fort Worth. Through Interlocal agreements signed in 1998 and amended as recently as 2014, both Dallas and Fort Worth receive a portion of tax dollars generated by development on airport property located within the surrounding host cities of Euless, Irving, Grapevine, and Coppell, as shown in Figure 3-5. The agreements are the basis of the airport's Land Lease Policy limiting the type and size of developments on airport property so they do not compete with developments within the adjacent host cities. The Interlocal Agreement also prohibits the cities from granting tax abatements and other incentives, including economic development grants, which would impact the amount of taxes payable to the Fort Worth and Dallas, without approval by the Cities of Fort Worth and Dallas and the D/FW Airport Board.

Figure 3-5: Tax Sharing Agreement Zones



Source: Greater Dallas Planning Council

Through the Interlocal Agreements, the airport is able to maintain its own land use plan and generate funds for airport operations and its owner cities, Dallas and Fort Worth, while also supporting the localities in which the development is located. In 2011, the tax sharing agreement provided the Cities of Irving, Euless, Coppell and Grapevine a total of \$63 million in tax contributions.

Airport Economic Impacts

The Dallas/Fort Worth Airport (DFW) is jointly owned by the cities of Dallas and Fort Worth, and day-to-day operations are handled by the DFW Airport Board. Since opening in 1973, the airport has been credited as a major driver of the regional economy and in 2013 the airport had an annual economic impact of \$31.6 billion, supported 143,000 full time jobs, and generated \$9.4 billion in annual payroll.¹⁵ To remain a strong regional economic force, and to diversify revenue sources, DFW is actively developing a multifaceted commercial center to generate additional economic activity for the region, and non-aeronautical revenue for the airport. The DFW Airport has utilized a Land Use Plan since 1967 and worked closely with adjacent cities to develop long-term development strategies which promote the highest and best uses for the airport, while avoiding competition with nearby cities.¹⁶ Updates to the land use plan, most recently completed in 2011 must be jointly approved by the DFW Board and the FAA.¹⁷

¹⁵ Dallas/Fort Worth International Airport, "Non-Aeronautical Revenue Development." April 8, 2014.

¹⁶ Dallas/Fort Worth International Airport, "Dallas City Council Briefing: Commercial Development Land Use Plan and Financial Business Model." Aug 3, 2011.

¹⁷ Dallas/Fort Worth International Airport, "Dallas City Council Briefing: Commercial Development Land Use Plan and Financial Business Model." Aug 3, 2011.

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DFW is using commercial development as a revenue stream for the airport and in 2013 commercial development generated \$36.6 million in revenue.¹⁸ As part of the Land Use Plan, the land surrounding DFW has been divided into 13 districts with distinct uses which cover approximately 6,600 acres of developable land.¹⁹ At full build-out the developments will support business activity of almost \$18 billion in new regional economic activity, support over 127,600 direct, indirect, and induced jobs which will create \$7.6 billion in new labor income, and generate almost \$420 million new annual revenue to state and local taxing entities.²⁰ Initial joint development projects between DFW and local developers have generated economic benefits through the creation of jobs and salaries. In 2001, International Commerce Park was the initial commercial development project at DFW which constructed a 432 acre state-of-the-art distribution and logistics center. The Park is located in a Foreign Trade Zone to attract international freight and logistics, and support the expansion of cargo growth. DFW invested \$37 million into the Park and developers contributed an additional \$247 million. By 2013 the Park had created 3,219 jobs which generated \$131.6 million in salaries and \$329 million in economic contributions to the DFW region.²¹ In addition to regional economic benefits, International Commerce Park is generating \$6 million in annual revenue for the Airport.²²

DFW has projections for increased passenger volume, and plans to continue developing land around the airport for commercial uses. The City of Irving's convention center and entertainment district's proximity to DFW will enable it to capture additional visitors and customers coming through the airport. DFW's strong vision for the long-term growth around the airport and continuous progress towards developing its vision has enabled adjacent cities and private developers to align their projects with DFW's growth and create a regional opportunity for development.

¹⁸ Dallas/Fort Worth International Airport, "Non-Aeronautical Revenue Development." April 8, 2014.

¹⁹ Dallas/Fort Worth International Airport, "Non-Aeronautical Revenue Development." April 8, 2014.

²⁰ University of North Texas, Center for Economic Development and Research, "Economic, Fiscal, and Developmental Impacts of Dallas-Fort Worth International Airport." September, 2013.

²¹ Dallas/Fort Worth International Airport, "International Commerce Park" Accessed on June 23, 2015.

²² Dallas/Fort Worth International Airport, "Non-Aeronautical Revenue Development." April 8, 2014.

DENVER INTERNATIONAL AIRPORT (DEN)

Denver International Airport (DEN) is located approximately 25 miles from downtown Denver and opened in 1995, making it one of the country's newest airports. As of 2014, DEN was the 18th busiest airport in the world and 6th busiest in the United States by passenger traffic, serving 53.5 million passengers in 2014. The airport has six runways served by a single terminal and three midfield concourses and occupies 54.1 square miles of land, making it the largest airport in the United States by total area. Early planning by the airport, in conjunction with surrounding municipalities resulted in a land use plan for the airport that encouraged airport-compatible uses to limit noise complaints that could potentially inhibit airport operations.

The latest major improvements at DEN are the development of the Denver International Airport Hotel (519 rooms) and Transit Center, and a commuter rail service which will further link DEN with downtown Denver scheduled to open in 2016. The airport is currently involved in an ongoing runway rehabilitation program with resurfacing planned for Runway 17L-35R. Future expansion plans include capacity for six more runways and another terminal. DEN's existing footprint is shown in Figure 3-6.

Figure 3-6: Denver International Airport



Source: Google Maps

Landside Development Activity

Since the airport opened in 1995, land development around its borders and in close proximity to the airport has been relatively slow, however, a few developments have begun. An initial development envisioned during the planning and construction of the airport which could take advantage of the airport's presence is Gateway Park, a 2,000 acre tract conceived in early 1990 to be a major multi-use development complex. Gateway Park borders the Airport and was annexed by the City to take advantage of spillover economic benefits from the Airport, which opened in 1995. The most prominent development to date is a 400-acre mixed-use development dubbed "Denver Connection." C.P. Bedrock, the project's master developer that has owned the land since 1997, and markets itself to potential builders

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with this pitch on its website: "The Denver Connection is in the middle of everything -- 15 miles from downtown, eight miles from Denver International Airport, five miles from the Anschutz Medical Campus, 13 miles to the Denver Tech Center, and surrounded by residential neighborhoods home to a highly educated work force". Several retailers are already operating on 27 acres of Denver Connection land include Walgreens, Chase Bank, TCF Bank, Carl's Jr., McDonalds, 7-Eleven, Family Dollar, and an inline building with frontage on 48th Avenue that includes an H&R Block, a Domino's Pizza, and medical and dental offices.

The under construction Denver International Airport Hotel and Transit Center is the latest step to enhance the airport's competitive standing as a leading global hub. When comparing the 15 largest airports in the world by passenger volume, nine currently have attached hotels. The hotel and connected transit center will promote tourism traffic to the surrounding municipalities.

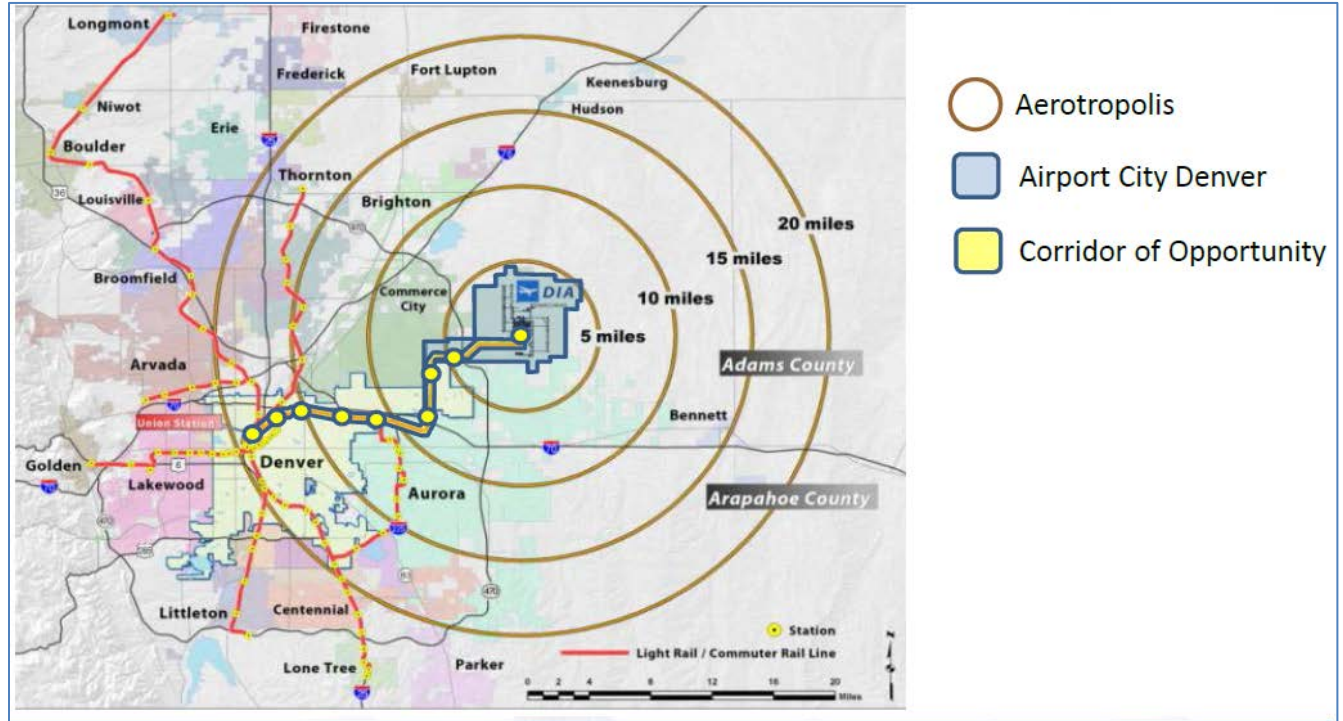
The Hotel and Transit Center is made up of independent but physically integrated projects, including:

- A 519-room Westin hotel and 26,000 square foot conference center;
- A transit center and commuter rail station serving the Regional Transit District (RTD) new rail line to downtown Denver and RTD buses; and
- An 82,000 square foot public plaza, Denver's newest venue for programs and events, where passengers and visitors can find entertainment, relaxation, art and restaurants.

In 2011, Denver retained a consulting firm to study and prepare a land development strategy for the best development of its lands. The study recommended the implementation of strategy based on an Aerotropolis/Airport City concept that not only includes the airport but also its surrounding communities. The implementation of this redevelopment has led to substantial revision of planned land uses. The Airport currently has 9,000 acres available for commercial development. In-depth planning is currently examining land uses in and around DEN to identify the most compatible land use plan considering current noise and height regulations and inter-agency agreements with Adams County. .

The Aerotropolis/Airport City concept is shown in Figure 3-7 includes the existing zoned land uses shown in Figure 3-8 and takes into account compatibility with noise contours shown in Figure 3-9.

Figure 3-7: Aerotropolis/Airport City Influence Area



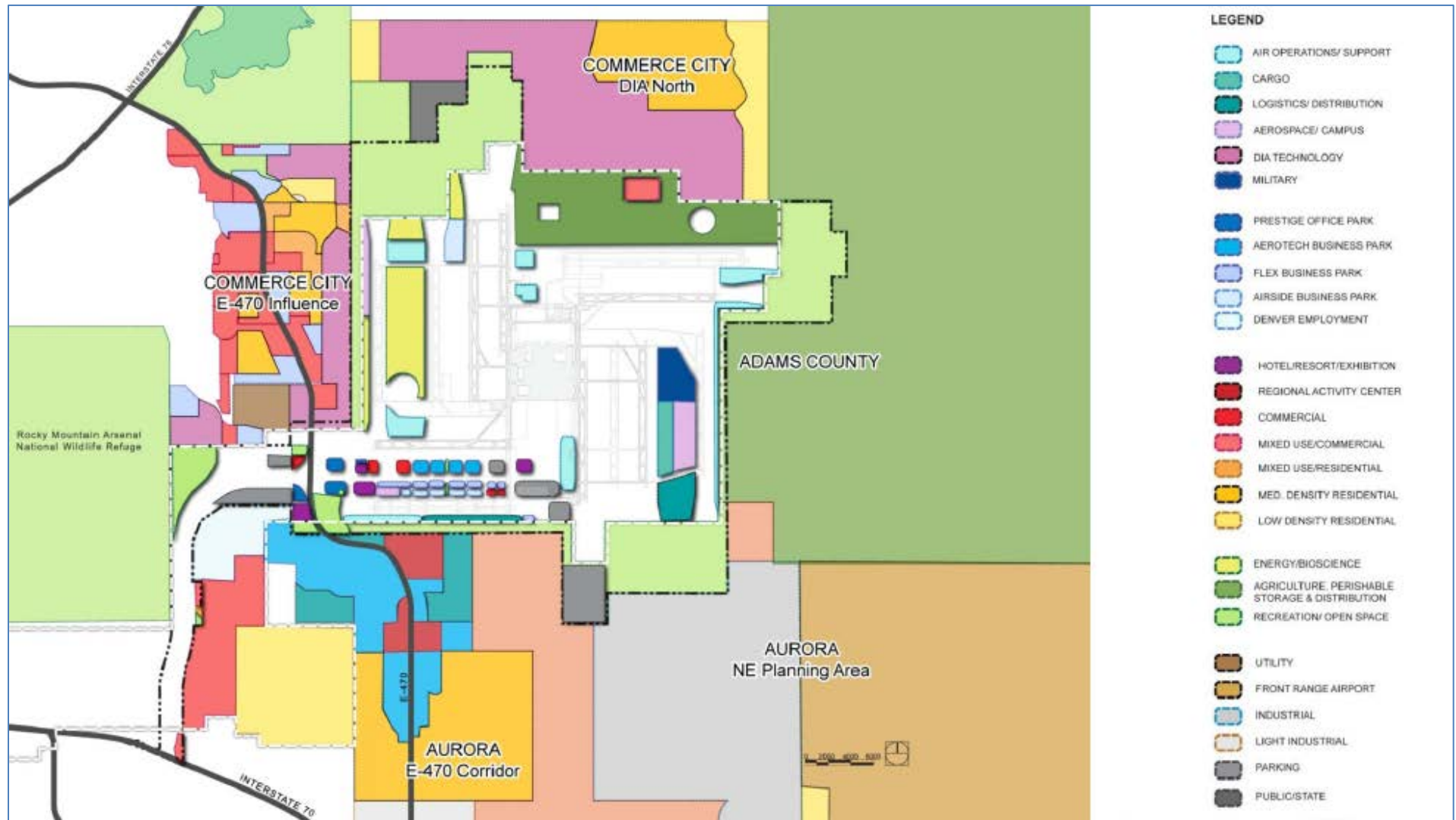
Source: Denver Aerotropolis/Airport City Opportunity

DEN's proposed Aerotropolis/Airport City concept targets development around the following economic clusters: renewable energy, industrial, agricultural and perishable foods, logistics, bioscience, and aviation/aerospace. The Aerotropolis/Airport City is envisioned as a compilation of five districts:

- "City Center" is imagined as the convergence point between the vibrant business community and the Airport's ongoing development initiatives.
- "City Gateway" would include mixed-use commercial and transit-oriented development.
- A Logistics center oriented towards rapid shipping facilities with international reach.
- "Aero District" offers secure access to "cargo, aerospace, aviation and military operations."
- "Tech District" emphasizes global collaboration between aerospace manufacturing, aviation, renewable energy, biosciences, and other tech industries.
- "Agro District" would support food processing/distribution, cold storage, greenhouse agriculture, bio-fuel industry, and warehouse space.

Section 3: Key Trends in Airport-Adjacent Development

Figure 3-8: Existing Land Use in Vicinity of Denver International Airport



Source: Denver Aerotropolis/Airport City Opportunity

Figure 3-9: Denver Airport Noise Contours



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Residential Development

By policy, no new residential development is allowed inside the 60 Day-Night Average Sound Level (DNL) noise contour and all prospective buyers of residences around the airport within approved residential zones are required to receive the DIA Homebuyers Guide which provides information and details of what is implied in living in close proximity to the Airport. DEN's policy restricting residential development within the 60 DNL noise contour is more protective of airport operations than current FAA regulations which do not support residential development within 65 DNL noise contours, which are typically directly under the flight paths of airports.

Rail Access

Construction is underway on the East Rail Line; a 22.8 mile commuter rail which will connect Denver International Airport to downtown's Denver Union Station and is scheduled to begin operations by 2016. Trains will run every 15 minutes during peak hours and every 35 minutes during off-peak hours. The rail line will be an important intermodal connection between DEN and downtown Denver and will serve adjacent employment centers, neighborhoods, and development areas in Denver and Aurora.

The rail link, shown in Figure 3-10, is already generating interest from developers in underdeveloped land along the rail and near the airport.

Key Development plans and station areas include:

- **38th & Blake and 40th & Colorado:** the Urban Land Conservancy has undertaken responsibility to develop transit-oriented development at these two stations. Development plans for these two stations include a mix of affordable and market rate housing, new office, ground floor retail, and a grocery store.²³
- **Central Park:** plans for a 34 acre development by Forest City Stapleton include one to two million square feet of office, 1,000 multi-family units with ground floor retail and 150-200 key room hotel.²⁴
- **61st and Pena:** Panasonic Enterprise Solutions Co, part of the Panasonic Corporation of North America is utilizing a public-private partnership with the State of Colorado and the City and County of Denver to develop an office and assembly facility on 400 acres of land around the planned metro stop. Development is expected to be complete by mid-2016 and will bring up to 300 jobs to the region.²⁵

²³ Armbrister, Molly. "DIA20: Development plentiful along the rail line to Denver's airport" Denver Business Journal. Feb 20, 2015.

²⁴ Armbrister, Molly. "DIA20: Development plentiful along the rail line to Denver's airport" Denver Business Journal. Feb 20, 2015.

²⁵ Colorado Office of Economic Development and International Trade, "Panasonic to Build Enterprise Solutions Base at the Pena Station Rail Stop in Denver." Dec 18, 2014.

Figure 3-10: Planned East Rail Line/A Line Connecting Denver Airport to Union Station



Source: 2015 FasTracks Regional Transportation District of Denver (RTD) Denver, Colorado

Policy Actions

As part of the planning efforts in 1988 prior to the construction of the new airport, the City of Denver and neighboring Adams County signed an Inter-Agency Agreement (IGA) to address a wide spectrum of issues related to the new airport — ranging from zoning issues, noise regulation, and runway configuration, to the number of hotel rooms the city of Denver could build on the new airport property. The underlying theme of the IGA was that any future economic benefit from the airport should help both communities and the region as a whole. The IGA required a vote by Adams County residents on Denver's annexation of 53 square miles of Adams County to build the airport. The IGA limited what Denver could build at the airport to only those land uses necessary for, or directly related to, the operation of the new airport. This could include manufacturing or other commercial activities which by customary practice require direct airside access. With the agreement, as stated by one of its authors "We didn't want to limit the airport, and we didn't want Adams County people to think it would have a disproportionate advantage. We were trying to find the balance." The IGA was aimed at ensuring that both the City of Denver and Adams County profited from the massive economic engine that the airport would become.

Despite the carefully drafted IGA, development policies recently proposed by the airport and the City of Denver have created friction between the City of Denver, Adams County, and the cities of Aurora and Commerce City. The policy under contention is intended to take advantage of the expected development that the new rail connection between the airport and downtown Denver will bring. In June 2015, the

Section 3: Key Trends in Airport-Adjacent Development

growing contention between jurisdictions and the threat of legal action by Adams County led Adams County and the City of Denver to sign an amendment to the 1988 IGA. In addition to Adams County, the cities of Aurora, Brighton, Commerce City, Federal Heights, and Thornton participated as members of the Airport Coordinating Committee (ACC) in the discussions that led to this agreement. The exact wording of the amendment is being drafted, but the primary changes centers on the same principals of the original IGA regarding the sharing of revenues from the development of airport commercial properties. The revision will also stipulate that development surrounding the airport will be dictated by the non-Denver entities, Adams County and its municipalities Aurora and Commerce City.

Additional components of the new agreement include:

- Denver and the Adams County communities will create a 1,500-acre pilot program at DEN to allow a wider spectrum of commercial uses than is currently permitted under the original 1988 IGAs. For example, the pilot program will allow uses such as retail, office parks, warehouses, and manufacturing even if they are not directly related to airport operations or aviation.
- Adams County and Denver will evenly split tax revenues generated from the new commercial uses on these 1,500 acres. ACC members have a set formula to apportion the Adams County share of revenues among themselves.
- Denver will also provide Adams County with an upfront payment of \$10 million, to be divided among the Adams County communities based on the same formula.
- DEN would retain all of the lease revenue from these new commercial businesses.
- The 1,500-acre pilot program may be expanded with approval from the ACC.
- Denver and the Adams County communities will create a regional entity to jointly market these new commercial business opportunities at DEN – and possibly over time plan, fund, and develop regional infrastructure.
- Land-use restrictions will be lifted on property on the edges of the airport. These “clear zones” were initially created as a buffer around DEN, but there is now consensus that the restrictions are no longer needed. Adams County and overlapping municipalities will receive 100 % of the tax revenue from new development in these “clear zones”, while DEN will retain the lease revenue.
- DEN will not seek new commercial businesses that would compete with the nearby Anschutz Medical Campus and Fitzsimons Innovation Campus in Aurora.

The amendment requires approval from the Denver City Council and Adams County Board of Commissioners and will take effect if ratified by voters in Denver and Adams County communities in November, 2015.

In addition to the collaborative relationship between the City of Denver, the Adams County community, and the airport on commercial development near DEN, the airport and its neighbors developed the *Homebuyers Guide to Denver International Airport Region*. The guide provides potential home buyers with information about the impacts of airport operations and planned airport growth. The Homebuyers guide task force – a coalition of real estate developers, business leaders, and airport officials, created the guide. All local government jurisdictions bordering DEN have recommended land use compatibility guidelines or have adopted zoning regulations to avoid incompatible land uses near the airport, but their policies and ordinances may differ.

Airport Economic Impacts

According to a 2013 report by the Colorado Department of Transportation, Denver International Airport (DEN) is the primary economic engine for the state of Colorado and generates \$26.3 billion in annual economic impact for the state and employs 35,000 individuals at the airport.²⁶ The Airport is owned and operated jointly by the City and County of Denver and the \$4.9 billion capital design and construction cost for the facility was financed by the city using airport bonds, federal aviation grants, and monies generated by the previous Stapleton International Airport.²⁷ The initial city investment appears to be paying off, since the airport has been profitable each year since opening in 1995 and the airport is generating annual economic impacts that are improving statewide economic conditions. Like Dulles, DEN is one of the few U.S. Airports with adjacent land available for expansion; eventually DEN airport could support the development of an additional six runways, another terminal and two additional concourses. As DEN has seen continued passenger growth, the airport is actively facilitating greater connectivity between the City, County, and airport through the development of the East Rail Line, a commuter rail line which will connect the Denver Airport to Denver Union Station. The East Rail Line is part of a fully-funded public private partnership, led by the Regional Transportation District (RTD) of Denver, which received voter approval in 2004 to improve transit access in the Metro region.²⁸ The East Rail Line is one of three lines under construction with a total cost of \$2.2 billion and a projected completion date in 2016.²⁹ Funding for the rail lines comes from federal grants and loans, RTD sales taxes, and contractor's financial contributions.

As the East Rail Line is being constructed between Union Station and the Airport, six distinct stations are under construction and initial transit oriented development has been planned at several of the stations. Anchoring the rail line at the airport is the new Transit Center, which is fully funded by the airport and will include a 519-room Westin Hotel and 26,000 square foot conference center, a transit center which will serve all the Regional Transit District buses and the new East Rail Line commuters, and an 82,000 square foot public plaza.³⁰ DEN is leading development activity at the new Transit Center which will be active before the arrival of the East Line commuter rail in 2016, the Westin Denver International Hotel is slated to open in 2015 and construction of the plaza is concurrent with the hotel.³¹ Leading the development process will enable the Transit Center to be an active public destination before rail arrives.

Strong regional collaboration between the Denver Airport, the City and County of Denver, the Regional Transportation District, and the state to complete the planned East Rail Line, and other commuter rail lines, was cited as a driving force behind the relocation of corporate entities to Colorado. The Panasonic Corporation of North America is developing a 400 acre site near the 61st and Pena station on the East Rail Line, which could eventually create up to 400 jobs and \$82 million in annual economic impact for the Denver region.³² The president of Panasonic's Enterprise Solutions oversaw a process which narrowed down 22 different cities to a final decision between the cities of Denver and Dallas. Denver was ultimately selected due to access to transit and the collaborative regional relationship³³ which facilitated a timely and efficient construction of the transit line. In addition, access to transit aligned with Panasonic's corporate

²⁶ Denver International Airport, "Press Kit 2014". Accessed June 22, 2015.

²⁷ Denver International Airport, "Press Kit 2014". Accessed June 22, 2015.

²⁸ Regional Transportation District of Denver, "Eagle P3 Project At a Glance, 2015 Fact Sheet." Accessed Jun 22, 2015.

²⁹ Regional Transportation District of Denver, "Eagle P3 Project At a Glance, 2015 Fact Sheet." Accessed Jun 22, 2015.

³⁰ Denver International Airport, "Press Kit 2014". Accessed Jun 22, 2015.

³¹ Denver International Airport, "Services, Hotels" Accessed Jun 22, 2015.

³² Armbrister, Molly. "DIA20: Development plentiful along the rail line to Denver's airport" Denver Business Journal. Feb 20, 2015.

³³ Armbrister, Molly. "DIA20: Development plentiful along the rail line to Denver's airport" Denver Business Journal. Feb 20, 2015.

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sustainability goals which promote eco-friendly practices, including mass transit.³⁴ As more corporations publicly embrace sustainability goals and emphasize eco-friendly practices, office buildings which are closer to mass-transit and enable employees to reduce their carbon footprint while commuting may gain a competitive advantage over office sites which are less transit accessible. The collaborative relationship between DEN and other public entities has created a favorable development environment which has promoted the long-term growth of the region and attracted private development.

³⁴ Armbrister, Molly. "DIA20: Development plentiful along the rail line to Denver's airport" Denver Business Journal. Feb 20, 2015.

MINNEAPOLIS-ST. PAUL INTERNATIONAL AIRPORT (MSP)

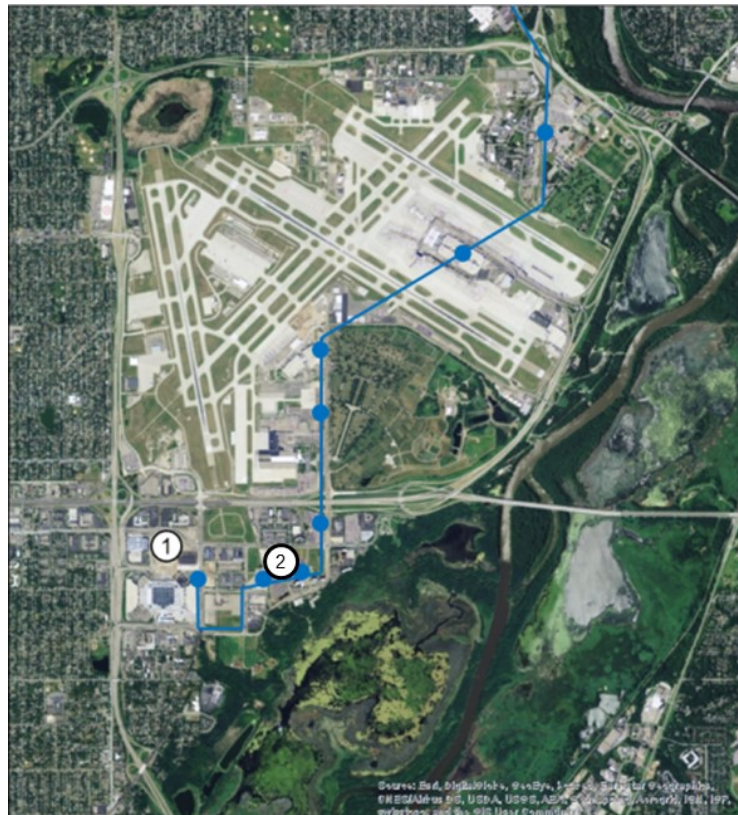
Minneapolis-St. Paul International Airport, located close to both Minneapolis and St. Paul, was first opened in 1921. As of 2014, the airport had four runways and two terminals, and occupied 5.3 square miles of land. The ACI ranked MSP 43rd in total passenger traffic worldwide (16th in North America) in 2014, when the airport moved 35.2 million people. The latest major improvements at the airport occurred as a result of the \$32 billion dollar, “MSP 2010: Building a Better Airport” initiative. Among many other developments, this investment resulted in new runways, the development of second terminal (the Humphrey Terminal), additional regional gates, additional parking, a new transit center, parallel light rail tunnels, an underground rail station, and an above ground surface rail station. These improvements were part of a plan to meet the forecast 2030 passenger levels.

As an older airport, MSP is surrounded by mature residential communities and the expansion of the airport to include new runways generated noise complaints from impacted communities. Working through a local committee to represent airport interests, and the cities of Saint Paul and Minneapolis, MSP has agreed to and enacted noise abatement procedures to reduce the impact of aircraft noise on the surrounding communities.

Landside Development Activity

The property immediately adjacent to the airport has been designated for airport uses. To the immediate southwest of the airport is the significant retail and commercial developments including the Mall of America. Some of MSP's existing and planned development initiatives are described below and shown in proximity to the airport and rail transit line in Figure 3-11.

Figure 3-11: Minneapolis-St. Paul International Airport, Surrounding Development, and Rail Transit



Source: Google Maps, Kimley-Horn, and HR&A Advisors

1. Mall of America

- Largest mall in America, the mall attracts over 40 million visitors annually, the most of any mall in the world.
- The Mall of America generates nearly \$2 billion in annual economic activity for the State of Minnesota and is 12 minutes by train from the airport, enabling passengers to visit the mall during a layover at MSP.
- A significant expansion project, Mall of America Phase II, is underway with completion expected in December 2015. This will extend the Mall's three levels and add an office tower, a multi-level parking garage, more than 50 high-end retailers, a food market featuring fresh and healthy culinary choices, a large event space, a tourist welcome center, and a 14-story JW Marriott hotel.

2. Bloomington Development

- Located around the Bloomington Central Station.
- 43-acre urban district to be developed by a private group of McGough Development and Health Partners.
- Three phases of construction have been approved for the site, only Phase 1 has been implemented. Construction for Phase 2 is underway and is expected to be completed by the end of 2015. Phase 3 construction is still pending approval of the results of a noise study that was required by the City Council.
 - Phase 1: included the renovation of the 550,000 square foot Health Partners Corporate Center and the development of The Reflections Condominiums, two 17-story towers with 263 units. Since the condominiums are constructed within the 60 DNL noise contours of the MSP airport, developers implemented a range of noise remediation efforts including, glass curtain building design to create a fully sealed building, a concrete building material to improve sound insulation, and all windows in the building are triple planed glass and cannot be opened. The buildings have no outside balconies.
 - Phase 2: the development of the Hyatt Regency Hotel, a 302-key property operated by Aimbridge Hospitality.
 - Phase 3: approved in December 2013 for the construction of a Lennar Multifamily project to include a six-story apartment building with 369-420 units and an attached above-ground parking ramp. Lennar has plans for an additional apartment building which would bring another 400 residential units to the area and complete the residential build-out for the Station. Concerns over noise insulation at the building due to building design and its location near the 65 DNL noise contours has forced Lennar to complete an extensive study demonstrating the noise reduction and efforts at the building.

This development is approximately 5,200 feet southeast of MSP Runway 17 which is closer than the approximately 9,200 that the Loudoun Gateway Station will be located from Runway 19R at Dulles Airport. A large portion, approximately 85% of the property, is within the 65 DNL contour based on MSP 2011 Noise Contours which as stated, has required the developer to take special measures to mitigate noise inside the buildings located inside and in close proximity to the 65 DNL contour. Planned residential development is outside of the 65 DNL noise contour, but within the 60 DNL contour. Developers are required to add extensive noise insulation and other types of mitigation factors.

Section 3: Key Trends in Airport-Adjacent Development

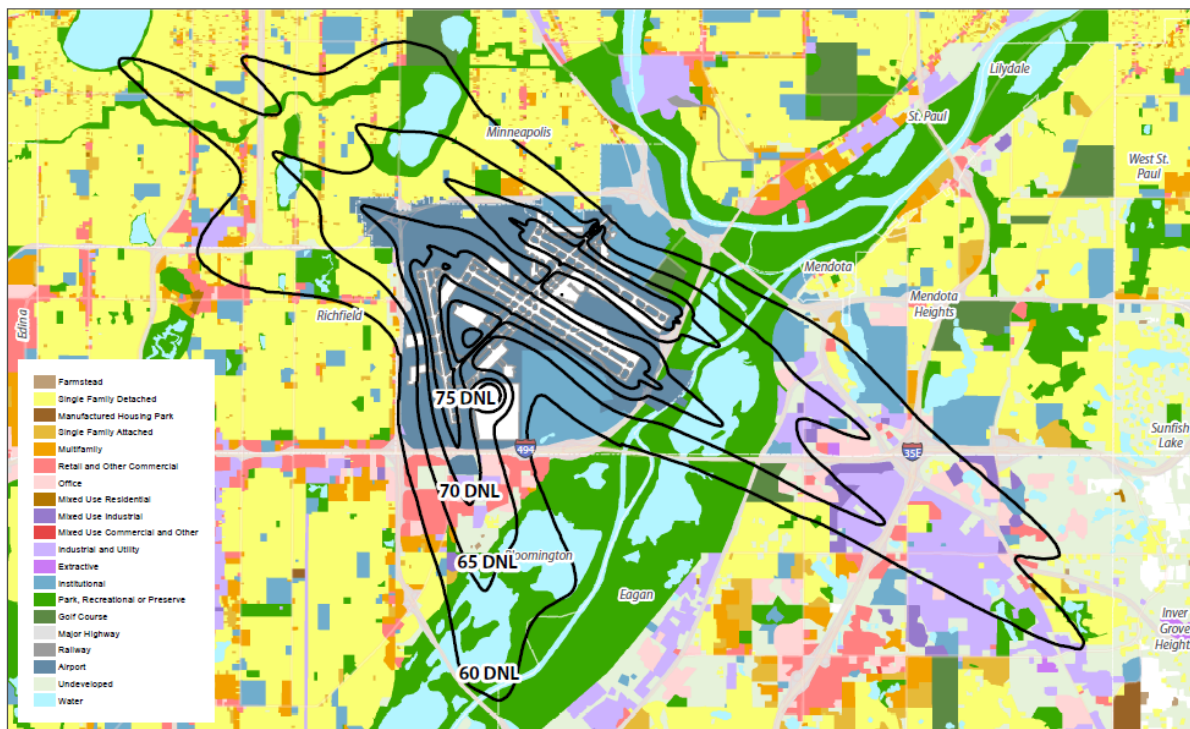
Residential Development

Significant residential communities around MSP have led to the development of strict Noise Abatement procedures that enabled the construction of new runway while simultaneously reducing noise complaints from the community. These residential communities and the noise contours are shown on Figure 3-12.

The following are a list of Noise Abatement procedures used by MSP and the surrounding communities:

- MSP Noise Oversight Committee, a multi-city advisory board to address aircraft noise issues at MSP and to bring policy recommendations to the Metropolitan Airports Commission;
- A runway Use Monitoring System;
- Establishment of the Eagan-Mendota Heights Departure Corridor to direct aircraft over noise compatible land uses south of MSP;
- Established departure profiles and procedures;
- Voluntary nighttime agreements; and
- A residential sound mitigation program.

Figure 3-12: MSP Noise Contours and 2005 Land Use



Source: Minneapolis-Saint Paul Metropolitan Airports Commission

Rail Access

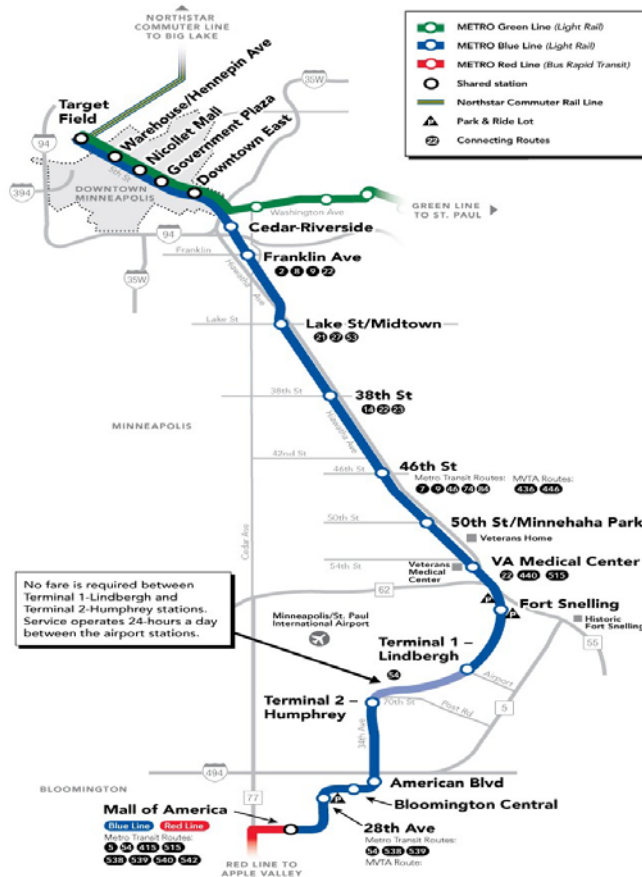
Metro Blue Line, a light rail line (LRT) connects MSP with downtown Minneapolis, the Mall of America, Target Field stadium, and the Northstar commuter rail line. This connection to the airport opened on a trial basis in October 2002, with full service beginning 2004. As shown in Figure 3-13, trains stop at both Terminal 1-Lindbergh and Terminal 2-Humphrey and connect travelers to 17 other destinations, including downtown and the Mall of America. A joint partnership between the Metropolitan Council, Metro Transit, MnDOT, the Metropolitan airports commission, and surrounding jurisdictions operates the line.

Section 3: Key Trends in Airport-Adjacent Development

In 2014, close to 9.5 million people rode the Blue Line with the largest ridership at the Mall of America and the MSP Stations. It was reported that over 2,000 airport employees ride the LRT daily. A passenger survey conducted in June 2011 indicated that 5% of residents and 3% of visitors travel to and from MSP by rail which translates to 4% of the passengers that originate or terminate at MSP.³⁵ In 2014 numbers, this would translate to approximately 760,000 travelers. Considering the number of daily rail trips reported by MSP employees and the number of travelers that use rail, the stations at the airport moved close to 1.5 million riders in 2014, or 15.8% of all riders on the Blue Line.

A survey conducted in September of 2011 for the Metropolitan Council showed that about 11% of visitors to the Mall of America come by rail.³⁶ As previously mentioned, the Mall receives about 40 million annual passengers which would translate to 4.4 million riders. The survey also indicated that about 2% of the visitors to the Mall came from MSP which would translate to about 800,000 visitors.

Figure 3-13: Blue Line LRT



Source: Minneapolis/St. Paul MetroTransit

³⁵ Minneapolis – St. Paul Airport Special Generator Survey, Metropolitan Council, Cambridge Systematics, April 2012

³⁶ Mall of America Special Generator Survey, Metropolitan Council, Cambridge Systematics, September 2012.

Section 3: Key Trends in Airport-Adjacent Development

A study carried out by Metro Transit in 2010 titled “The Before and After Study of the Hiawatha Light Rail Transit Line,” made a high-level assessment of the various impacts that the LRT had on and around the Rail Stations.³⁷ Following are some relevant comments from the study regarding land development around the Bloomington Central and 46th Street Stations, two of the four stations the study asserts have been the catalyst for land development.

Figure 3-14 shows some of the key developments around the Bloomington Station, as well as the location of the four LRT stations that follow the Airport Terminal LRT Stations. Other than the developments described around the Bloomington Station, little development has happened at the America Boulevard Station and the 28th Station. Current developments included office and local government buildings, hotels, a museum, some retail and large parking lots.

Figure 3-14: Bloomington and other LRT Stations Past MSP



Bloomington Central Station

- An initial phase of redevelopment in the Airport South District, the Bloomington Central Station Plan was approved by City Council in 2004 and provides a vision for 43 acres of redevelopment around the Bloomington Central Station.

³⁷ Before and After Study Hiawatha Light Rail Transit Line, Metro Transit August 2010

Section 3: Key Trends in Airport-Adjacent Development

- At full build out, the Bloomington Central Station District will include 1,100 new housing units, 9,000 jobs (7,000 of them new), almost 2 million square feet of new office space, and a full-service hotel with 350 rooms, 75,000 square feet of street level retail and restaurant space, and a 1.59 acre park adjacent to the LRT station.
- As part of the planned development occurs within the 60-70 DNL noise contours from the ongoing operations of Minneapolis/Saint-Paul Airport, all buildings are required to add noise insulation. Land use allows commercial and office development and residential uses may require additional noise remediation efforts.

46th Street Station

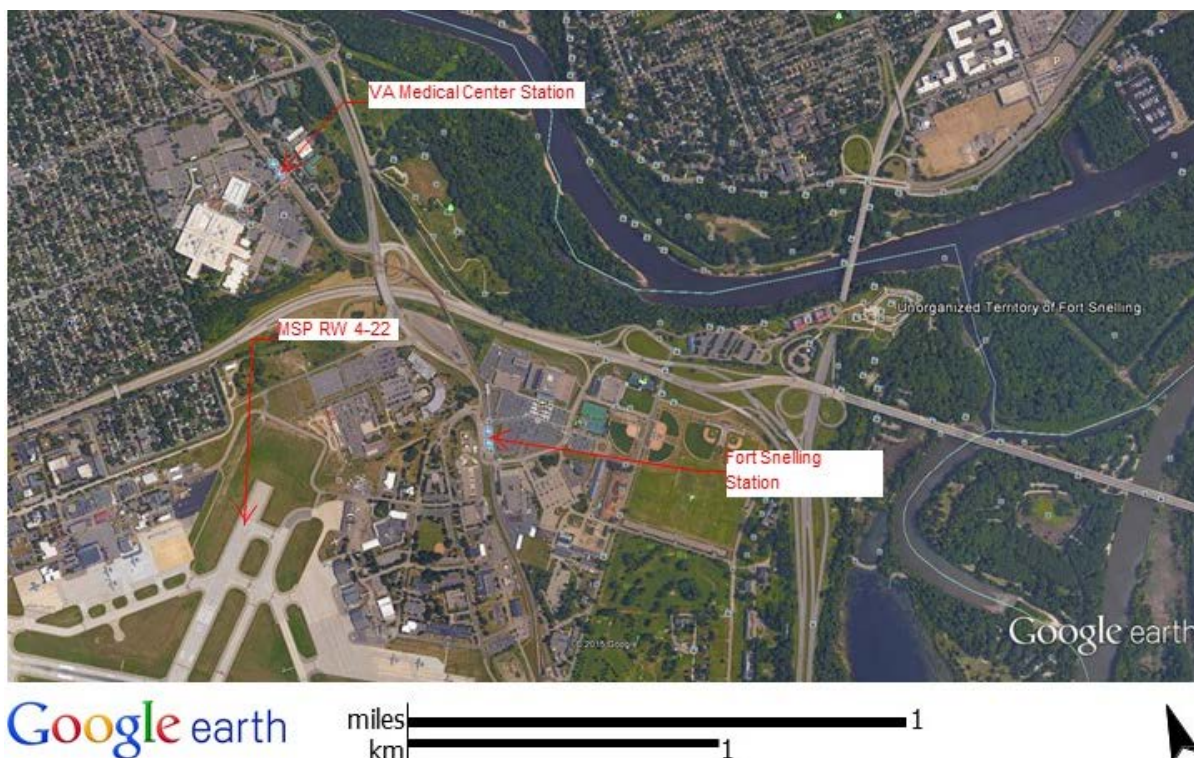
- Located outside of the current flight paths at MSP, the existing development typology around the 46th Street Station includes older single-family detached homes or duplexes, surrounded by older industrial and commercial uses. The proximity of older commercial and industrial uses offers an opportunity to redevelop those sites as additional residential uses and follow a transit oriented development pattern due to the presence of the Blue Line LRT.
- An updated plan for the 46th Street Station was adopted by the Minneapolis City Council in December of 2001 which called for an additional 500 residential units, 145,000 square feet of retail and a town square which would connect the current station and the nearby Minnehaha Park.
- Implementation planning occurred in 2007 and focused on property owner participation, parcel configuration, development economics, and initial infrastructure design considerations and utility relocation.

Figure 3-15 shows the closest metro station on the north side of the Airport, the Fort Snelling, and VA Medical Center Stations. Neither station is under the direct approach and departure flight paths but are in close proximity to the north-south airport runways. Following is a brief description of developments around the stations

Fort Snelling & VA Medical Center

- LRT Stations directly north of the MSP airport and just outside of the existing 65 DNL noise contours.
- The land around the Fort Snelling and VA Medical Center Stations are owned by the military and Federal government and have yet to see major commercial development.
- The Fort Snelling Station has the second largest park-and-ride lot on the Blue Line with a total of 1,080 parking spots.

Figure 3-15: Area Around the Fort Snelling LRT Station



In addition to the planned redevelopment of the Bloomington Central Station and the 46th Stations, the following additional developments have occurred along the line:

- Expansion of the 28th Avenue Park & Ride to 1,600, or 1,100 more spaces, in mid-2008.
- New American Boulevard (on 34th Avenue) Station in Bloomington opened in 2008.
- Airport Humphrey Terminal Station re-opened in 2007.
- New grocery store and nearly 4,000 new units of multi- family housing at 38th Street in 2012.
- New commercial and multi-family housing at Cedar-Riverside, by 2010.

Analysis of the Hiawatha Light Rail Transit Line report suggested that while some of the growth across the city could have occurred without the LRT, the rail has been a catalyst for residential and commercial development since it enables a seamless live, work, and shop experience for residents, workers and visitors

Policy Actions

The Wold Chamberlain Field Joint Airport Zoning Board (JAZB) was created in 1984 to govern land use and the permitted height of structures, vegetation, and other potential obstacles in the flight paths and near Minneapolis-St. Paul International Airport, and under the approach and departure paths for flights to and from the Airport. The JAZB is a collaborative entity between the Metropolitan Airports Commission ("MAC"), the Cities of Bloomington, Eagan, Mendota, Mendota Heights, Minneapolis, Richfield, and Saint Paul and the County of Hennepin. The Minneapolis-St Paul International Airport (Wold Chamberlain Field) Zoning ordinance (MZP) adopted in 1984 by the JAZB was first amended in 2004 to account for changes at the airport that would impact surrounding communities, including the anticipated construction of a new runway that opened in 2005 and a runway extension built in the early 2000s. The ordinance identified new hazard zones, properties the airport would need to purchase, and areas requiring rezoning to reduce

Section 3: Key Trends in Airport-Adjacent Development

the impact of additional noise and other hazards created by the operation of aircraft on the new and longer runways. The action came after a law suit by the surrounding communities. In collaboration with the FAA Airport Improvement Program (AIP) program, the airport entered into a consent decree and has instituted a program since 2007 to alleviate noise exposure to properties within the 60 DNL noise contours. As shown in Figure 3-16: Table Summarizing Noise Mitigation Actions in Consent Decree, the parties to the law suit agreed to a series of noise mitigation actions with an estimated economic value in excess of \$125 million.

Figure 3-16: Table Summarizing Noise Mitigation Actions in Consent Decree

10/16/07

| SUMMARY OF CONSENT DECREE | |
|---|---|
| Total Homes to be Mitigated | <ul style="list-style-type: none"> Estimated 9,561 homes eligible using block intersect method |
| Mitigation for Single Family Homes in 2007 DNL 63 and 64 Contours | <ul style="list-style-type: none"> MAC will install Five Decibel Reduction Package Program includes homes that opted out of the original Sound Insulation Program, but had a new owner by September 1, 2007 Construction will begin by November 1, 2008, and all homes shall be completed by December 31, 2009; MAC must finish 250 homes by July 1, 2009, and 320 homes by September 1, 2009 |
| Mitigation for Single Family Homes in 2007 DNL 60, 61 and 62 Contours | <ul style="list-style-type: none"> MAC will install one of the following options, as chosen by the homeowner: <ul style="list-style-type: none"> If the home has no central air conditioning: installation of central air conditioning and \$4,000 mitigation from Mitigation Menu If central air conditioning exists or homeowner without central air conditioning chooses not to receive central air: installation of \$14,000 of mitigation from Mitigation Menu The Mitigation Menu shall include a similar range of mitigation products as the Five-Decibel Reduction Package, but will not include air conditioning Program includes homes that opted out of the original Sound Insulation Program, but had a new owner by September 1, 2007 Construction will begin by December 1, 2008, and be complete by December 1, 2012 |
| Mitigation for Multi-Family Homes in 2007 DNL 60-64 Contours | <ul style="list-style-type: none"> MAC will install through-the-wall air conditioning and acoustic air conditioner cover for each unit Construction will begin by December 1, 2008, and be complete by December 1, 2010 |
| Reimbursement for New Mitigation for Single Family Homes Between 2007 and 2005 DNL 60 contours | <ul style="list-style-type: none"> MAC will make \$7 million available for (1) homes that opted out of 1996 program and had new owners on September 1, 2007, and (2) reimbursement for new noise mitigation undertaken by homeowners The amount of mitigation reimbursement will be capped based on how much of the \$7 million remains after mitigating the opt-in homes. Preliminary estimates of the reimbursement funds are about \$3,000 per home, but will be calculated at the end of 2009. Work done between the Court's entry of the settlement and July 31, 2014, is eligible for reimbursement – prior work is not eligible All work must be for products and services on a MAC-published Noise Mitigation Reimbursement List All work must be done by licensed contractor Reimbursement to start on March 1, 2010, and be complete by September 1, 2014 |
| Inflation Protection | <ul style="list-style-type: none"> Inflation protection based on 2007 dollars for all programs |
| Attorneys Fees | <ul style="list-style-type: none"> MAC will pay Plaintiffs \$2.25 million for attorneys' fees and costs MAC will pay \$2 million for attorneys' fees and costs as part of the proposed <i>Wiencke</i> settlement |
| Reimbursement to MAC | <ul style="list-style-type: none"> Owners of single family homes who sell their homes within two years of receiving relief under this settlement shall reimburse MAC for 25% of the cost of providing relief to their home, to a maximum of \$3,500. The following categories of owners shall be exempt from this reimbursement requirement: <ul style="list-style-type: none"> Owners who purchased their homes prior to September 1, 2007. Owners who used their homes as their primary residence. Owners conveying their interests in their homes due to death, divorce, loss of job, job relocation, medical conditions, transfer to family member, birth, or adoption Owners whose sale price for their home was lower than the price for which they purchased their homes. |
| Conditions that Must Be Met for Decree to Become Effective | <ul style="list-style-type: none"> Court must enter consent decree Court must approve settlement in <i>Wiencke</i> class action case within 90 days of court approval of decree FAA must approve consent decree by November 30, 2007 Consent decree would be null and void if these conditions are not met |
| Relationship to FAA | <ul style="list-style-type: none"> MAC agrees that the elements of the settlement are an appropriate use of airport revenue and consistent with its other obligations to FAA MAC will use its best efforts to defend against any claims to the contrary, including taking all appeals. MAC agrees to support City intervention in any challenge. If any court, after all appeals, finds that MAC cannot use any revenue on this program, Consent Decree becomes null and void |
| Jurisdiction of the Court and Dispute Resolution | <ul style="list-style-type: none"> Court retains jurisdiction to enforce Decree and consider disputes that are not designated for arbitration Disputes regarding schedule, DNL 63-64 program, reimbursement program and individual homes go to arbitration All disputes must first go to three-member Technical Advisory Committee |
| Obligations to Propose Zoning Ordinances | <ul style="list-style-type: none"> By September 1, 2008, each City staff will propose to each City Council a draft ordinance requiring (1) attenuation and air conditioning or ventilation for new homes in the DNL 63-64 and higher contours; (2) noise attenuation for additions to homes in the DNL 63-64; and (3) air conditioning or ventilation for new homes in the DNL 60-62 Cities will encourage persons renovating or remodeling to insulate to high level |
| Releases of Liability | <ul style="list-style-type: none"> Cities agree to release liability for current or past claims for liability based on noise, unless MAC builds a new runway or noise increases by 2 decibels MAC may require homeowners to sign releases comparable to the ones it required them to sign in 1996 noise mitigation program |
| Estimated Value of Relief in 2007 Dollars | <ul style="list-style-type: none"> \$127,650,000 |

Source: City of Minneapolis, Consent Decree Summary Oct. 2007

Airport Economic Impacts

The Minneapolis/Saint-Paul airport is managed and run by the Metropolitan Airports Commission (MAC) which was established by the state legislature in 1943 to provide coordinated aviation services for the Twin Cities area. As a regional airport, MSP has a broad economic impact in the area and in 2012 it was estimated the airport had a \$10.1 billion in economic impact, (\$5.7 billion in direct impact and \$4.42 billion in secondary impacts) in the region; supported 76,340 jobs with 19,800 direct to operations at MSP, 24,500 due to visitor spending in the Twin Cities from people who arrive through MSP, and jobs 32,040 from secondary impacts; and those employees generated \$2.97 billion in annual earnings (\$1.2 billion direct from airport operations, \$500 million due to visitor spending and \$1.9 billion in secondary impacts); and the airport generated \$611 million in annual taxes, of which \$358 million in federal taxes, \$243 million in state taxes and \$10 million in local taxes.³⁸

The Mall of America (MOA) has an estimated \$2 billion to the State of Minnesota, and employs 15,000 employees during key holiday seasons and summer months.³⁹ The MOA is the most popular tourist attraction in Minnesota, and attracts 40 million annual visitors, of which 40% are traveling from outside of a 150 mile radius.⁴⁰

Aside from anchoring the state's tourism industry, the MOA is seen as an anchor for development in the City of Bloomington. City plans project that 65% of growth over the next 30 years will occur in an area adjacent to the MOA.⁴¹ As a cornerstone of planned growth in the City of Bloomington, and an ongoing source of economic activity in the state, both governments provided tax incentives to support its expansion. In 2014, groundbreaking for the expanded MOA was forecast to cost \$2 billion and included plans for a 14-story, 342-key JW Marriott, an 180,000 square foot office tower, and 165,000 square feet of new retail.⁴² At full build-out the additional development would generate increased economic activity, including the creation of an additional 2,500 permanent jobs through added retail, hotel, and office operations; doubling the economic impact on the state of Minnesota to \$4.3 billion; and increasing visitors by an additional 20 million, of which up to 60% are likely to come from more than 150 miles to see the mall.⁴³ Prior to groundbreaking in 2014, the MOA received several rounds of state and local incentives to facilitate the redevelopment of the mall. In 2012 the state and city agreed to fund \$49 million to rehabilitate Lindau Lane,⁴⁴ which is a key vehicular artery to the MOA and also bisects the area of town where the city has forecasted a majority of growth in the coming years. The State of Minnesota agreed to use state bonding capacity and reimburse \$15.45 million of the project costs,⁴⁵ while the City bonded \$34 million through a TIF related to street improvements (including a 600 space underground parking garage, utility connections and surface streets).⁴⁶ Aside from a state and local contribution towards street improvements in 2012, the state contributed an additional \$250 million in property tax revenue in 2013 to help support expansion plans, focusing additional funds towards the construction of additional roads,

³⁸ Minneapolis/Saint-Paul International Airport. "New Study Estimates Minneapolis-St. Paul International Airport Generates \$10.1 Billion Annually for Twin Cities Economy" Minneapolis-St. Paul International Airport Economic Impact Study.

³⁹ Mattson-Teig, Beth. "Mall of America Expansion Draws Closer" Finance and Commerce. Nov. 15, 2013.

⁴⁰ Mattson-Teig, Beth. "Mall of America Expansion Draws Closer" Finance and Commerce. Nov. 15, 2013.

⁴¹ Long, Julie. "Bloomington Paves the Way for Future Development Near Mall of America." American Public Works Association, Minnesota Chapter. Sept 14, 2013.

⁴² Johnson, Brian. "Mall of America expansion on schedule." Finance and Commerce. Apr 9, 2015.

⁴³ Moore, Janet. "'Ground' broken on \$325 million Mall of America expansion" Star Tribune. Mar 19, 2014.

⁴⁴ Star Tribune, "Lindau Lane to be rebuilt as part of MOA expansion." Star Tribune, Apr 25, 2012.

⁴⁵ Star Tribune, "Lindau Lane to be rebuilt as part of MOA expansion." Star Tribune, Apr 25, 2012.

⁴⁶ Moore, Janet. "'Ground' broken on \$325 million Mall of America expansion" Star Tribune. Mar 19, 2014.

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parking ramps, and other infrastructure required during expansion.⁴⁷ While the MOA was criticized by some state lawmakers for receiving state subsidies, the MOA plays a unique role as a state tourism attraction bringing state, national, and global visitors to the mall. The long-term growth and continued expansion of the Mall of America is facilitated by the strength and success of MSP which provides a convenient and reliable way to access the mall.

⁴⁷ Reilly, Mark. "Mall of America state subsidy resurfaces" Minneapolis/St. Paul Business Journal. May 6, 2013.

FRANKFURT INTERNATIONAL AIRPORT (FRA)

Frankfurt Airport, located 7.5 miles southwest of Frankfurt, Germany, opened in 1936. As of 2014, the airport had four runways and two passenger terminals on approximately 7.7 square miles of land. The ACI ranked FRA 11th in total passenger traffic worldwide in 2014, with just under 60 million passengers (59.6 million) which was an increase of 1.5 million passengers over its 2013 passenger volume. It was ranked 7th in international passenger traffic and 9th in international cargo traffic, and is also the busiest aviation cargo hub in Europe at 2.16 million tons in 2014.

Major improvements at FRA occurred first in 2011 with the opening of an additional runway and again in 2012 with the opening of Pier A-Plus, the westward extension of Terminal 1. In order to prepare for the forecasted rise in passenger volumes at FRA (potential forecasts reaching up to 73 million passengers by year 2021), the current terminal capacity of 64 million passengers will be bolstered by the development of a third terminal, constructed on the south side of Frankfurt Airport. Terminal 3 is planned to be completed and operational no later than 2022 and will increase airport capacity by 14 million additional passengers. To further support FRA's place as an international hub and home to Lufthansa, the airport is also expanding the A380 maintenance base for Lufthansa's A380 Fleet. The second phase of construction on the maintenance base is planned to be completed within the next 3 to 5 years.

Complaints from nearby residential development at Frankfurt Airport, led the local court system to limit airport operations and ban nighttime flights. The reduction in nighttime operating hours negatively impacted cargo operations and Lufthansa, the largest cargo carrier at Frankfurt airport estimated it could lose up to €40 million in annual earnings due to the ban on nighttime flights.⁴⁸ Aside from increasing the cost of operations for cargo carriers, increased regulation was cited as a factor that made the airport a less desirable hub for cargo operations.

Landside Development Activity

In addition to land for passenger activity and airport operations, FRA has dedicated a substantial portion of its airport-adjacent land to the development of the "Airport City" concept. This includes approximately 370 acres dedicated to Cargo City, the premier European logistical hub that concentrates all companies involved in the airfreight process chain at a single site. Also counted among Frankfurt's "Airport City" developments are the Squire and Gateway Gardens. Some of FRA's existing and planned development initiatives are described below and shown in proximity to the airport and rail transit in Figure 3-17.

⁴⁸ Schafer, Daniel. "Infrastructure: Night flight ban threatens airport expansion" Financial Times. Jun 8, 2012.

Figure 3-17: Frankfurt Airport, Surrounding Development, and Rail Transit

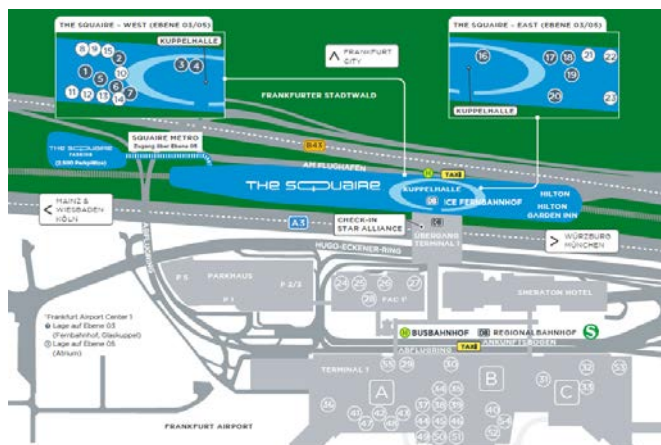


Source: Google Maps, Kimley-Horn, and HR&A Advisors

1. The Squire

- Envisioned as a “New Work City” adjacent to the airport. The development opened in 2011 with 2,152,800 square foot of space (1,560,800 rentable) for up to 7,000 workers and 3,000 visitors, customers, and hotel guests, plus 3,125 parking spaces. A detailed site plan is shown in Figure 3-18 below.
- Built above the ICE high-speed train station, the Square is a 5 minute walk from Terminal 1 and the regional train station, and a 10 minute drive to central Frankfurt.
- Supports a variety of office (94,500 square feet), hotel (34,500 square feet), retail and restaurant (5,900 square feet), and service uses, including:
 - Hilton Garden Inn (Mid-Class, 334 rooms) and Hilton (First Class, 248 rooms);
 - Large ballroom;
 - Business and Conference Center; and
 - Medical Center.
- The Squire’s current occupancy is 82%. IVG, the building owner, pursued plans to sell the property due to a low return on investment but called off plans after refinancing.

Figure 3-18: Concept Plan for the Squaire



Source: www.fraport.com

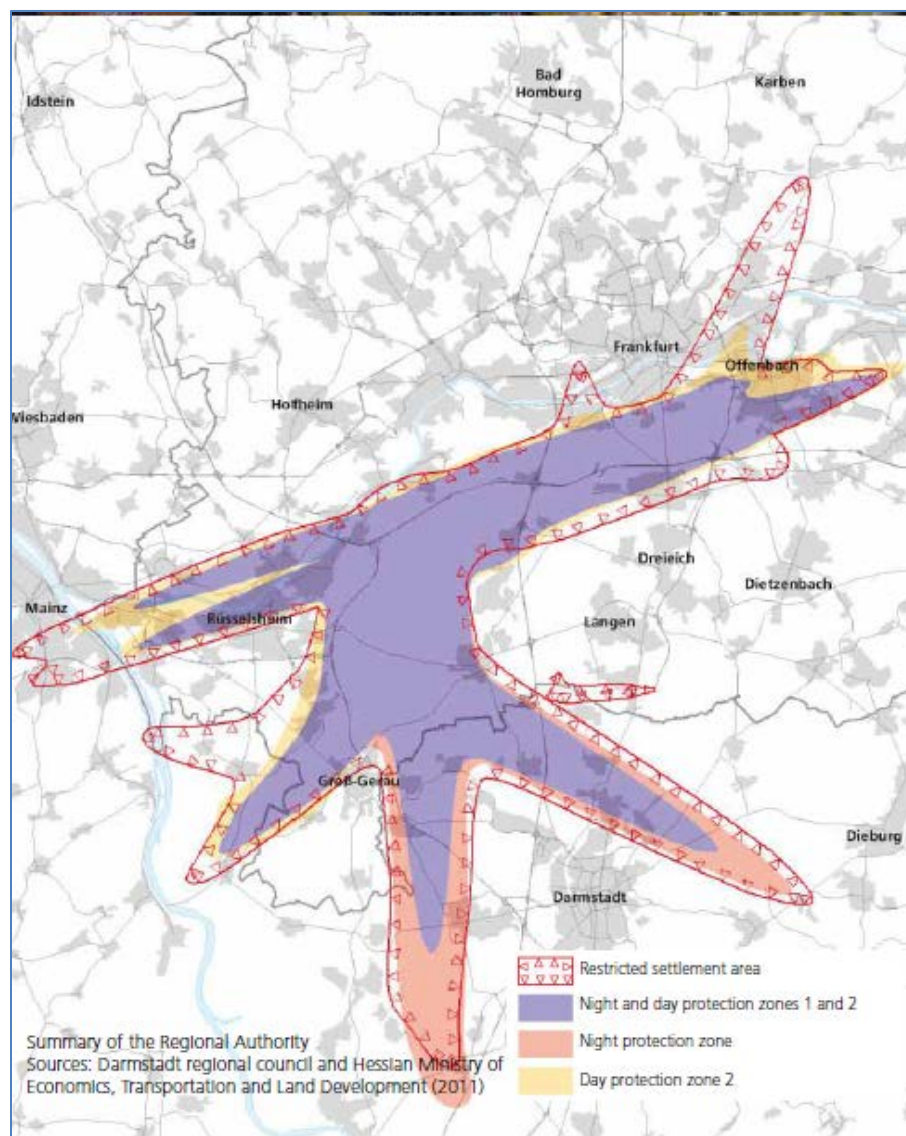
2. Gateway Gardens

- Envisioned as a “Global Business Village,” Gateway Gardens is a new planned district on approximately 80 acres of land in walking distance to Terminal 2. It is the largest neighborhood development of any “Airport City” in Europe. The land was previously a residential area for the family of US Air force personnel working at a military installation at the airport.
- By 2021, the development will include office, hotel, retail and restaurant, and education and research land uses. Hospitality uses will include the Park Inn Hotel (209 rooms), The Menninger Hotel Frankfurt (168 rooms), Starwood Hotel and Resorts (apartment hotel, 133 rooms), and 2 additional planned hotels.
- A recent influx of high-end hotel openings in Frankfurt signals a slow but steady transition to leisure travel:
 - The latest tourism statistics show foreign visitor overnight hotel stays climbed 4.4% from January 2010 to October 2011.
 - FRA currently offers among the fewest bedrooms per passengers compared to other aviation hotel markets. However airports with a high availability of transit, which FRA enjoys, require fewer hotel rooms in close proximity to the airport.
- When fully developed, up to 18,000 people will work within the Gardens.
- The development priority is to create an urban experience with a diverse mix of users.
- Directly adjacent to Frankfurt Airport, proximate to the long-distance ICE Train station; an on-site suburban train station and public bus service is planned to further increase the connectivity of the site.
- As of 2014, 30% of properties at Gateway Garden had been marketed.

Residential Development

The airport and its surrounding communities have adopted strict agreements to restrict the development of new residential development within the 60 DNL contours. The airport and surrounding communities have agreed that the airport will buy or insulate residences within the 60 DNL. Additionally the airport uses has a number of active and passive noise abatement strategies to reduce noise impacts on the surrounding community which are continuously measured by sensitive receptors. Day and Night noise counters are shown in Figure 3-19.

Figure 3-19: Frankfurt Airport Day and Night Noise Contours



- Active Noise Abatement utilized at Frankfurt Airport:
 - Vertical optimization of aircraft departure procedures;
 - Dedicated runway operations for certain type of aircraft;
 - Segmented approach procedures to avoid densely populated areas by relocation approach paths and using continuous descent approaches;
 - Taking into consideration tailwind component for aircraft departures;
 - Increased ILS Glide Path Angle to Northwest Runway;
 - Lufthansa's Aircraft replacement program for quieter Boeing 737 Fleet; and
 - Having jet engine testing at the A380 Pier A-plus maintenance facility which is far from residential areas.

Section 3: Key Trends in Airport-Adjacent Development

- **Passive Noise Abatement used at Frankfurt Airport:**
 - Fraport AG, the airport operator, runs a “Casa” initiative to purchase residential property where planes fly particularly low – at an altitude of less than 1,150 feet – or it pays the owners compensation. Fraport AG purchased over 250 houses through the “Casa” program and rents them out, with vacancy rates less than 3%.
 - Defined noise abatement zones which allow around 86,000 households to make claims for passive noise abatement protection for their homes.
 - At its own initiative, Frankfurt Airport introduced noise-related airport charges in 1993. Charges not only provide economic incentive to introduce more quiet aircraft, but also for transferring aircraft movement from night to day. In July 2010, the noise components for the airport charges were further articulated and are now subdivided into twelve noise categories.

Rail Access

Frankfurt Airport is served by 174 daily high-speed long-distance trains and 223 daily commuter and regional trains. Between all rail offerings, there are over 8.5 million passengers arriving at or departing from the airport per year via rail. Rail has had a significant impact on the modal split of passengers. In 1999, 21% of originating passengers arrived by rail compared to 36% in 2012.

Integration of Frankfurt Airport into the high-speed rail network has expanded the airport's catchment area compared to airports without long-distance train stations, and eased flight capacity issues by transferring some short-haul traffic to rail. The opening of the new high-speed rail route between FRA and Cologne in August 2002 doubled the number of passengers using the long-distance trains and reduced travel times to further locations by about one hour. Supplementing the long distance offerings, Frankfurt Airport's integrated regional trains provide for fast connections between the airport and the City of Frankfurt (15 minutes).

Policy Actions

A mediation process established in 2008 between neighboring cities and Fraport AG helps the parties to reach consensus on major options for future airport development and zoning, and fosters a closer relationship between the airport and its neighbors. In addition, a Regional Dialog Forum was created to provide opportunities for participation, consultation, policy clarification, and decision-making. The Regional Dialog Forum allows stakeholders to engage in open and frank dialog regarding the impact that airport operations and developments at the airport, and its surroundings, have on the quality of life of neighboring communities. Mayors of neighboring cities, the airport, and other major stakeholders have also established the Airport and Region Forum where developments are discussed and potential impacts addressed. This forum brings together the dialogues about the development at Frankfurt Airport and cooperation in the region. It focuses on the exchange of development views with neighboring communities, noise monitoring, and the development of noise protection measures.

Since July 2009, the non-profit company Umwelthaus GmbH, founded by the State of Hesse where the airport is located, has operated the Environment and Community Center (ECC), which is responsible for setting standards for information exchange and transparency between the neighboring communities and the airport. The ECC is a neutral, unbiased, and transparent organization whose main objective is to improve communication and cooperation between Frankfurt Airport, its users, and the neighboring residents. In addition, the ECC is also responsible for various monitoring activities – including monitoring aircraft noise and social and environmental monitoring – and to review the facts and findings on environmental issues between the airport and the communities in a neutral way.

As previously mentioned, the airport instituted a noise charge program in 1993 and updated this program in July 2010. Charges are now subdivided into twelve noise categories that penalize night operations through higher costs if the aircraft movement occurs in the hours bordering nighttime (10:00 p.m. – 10:59 p.m. and 5:00 a.m. – 05:59 a.m.). The airport is closed to operations between 11:00 p.m. and 5:00 a.m., although under very limited circumstance aircraft operators may request a special permission from the State to operate between 11:00 p.m. and 12 midnight. This pricing structure not only provides economic incentives for operators to introduce quieter aircraft, but also the transfer of aircraft operations from night to day. Revenue collected through these charges fund the “Casa” program, where the Airport purchases residences under flight paths where aircraft fly particularly low – at an altitude of less than 1150 feet – or pays the owners compensation.

On February 29, 2012 the Hessian State government, representatives of Fraport AG, and major stakeholders involved in air transportation at the Airport signed the declaration “Together for the Region – Alliance for More Noise Abatement 2012.” This agreement considerably expands the existing noise mitigation program to cover larger affected areas and includes additional funding of approximately \$98 million (USD). The agreement also has considerably improved relationship between the Airport and its neighboring cities of Raunheim, Flörsheim, and Kelsterbach.

Airport Economic Impacts

Frankfurt Airport is Germany’s single largest place of employment and currently maintains a staff of 78,000 employees at the airport.⁴⁹ The Frankfurt Airport is managed by the Fraport Group, and profit sharing (and ownership) of the airport revenues is divided between the German State of Hesse (31.4%), the City of Frankfurt (20%), Lufthansa (3.2%) and by Lazard Asset Mgmt (3%), other shareholders were too small to identify.⁵⁰ In 2013, activities at the airport generated €2.6 billion in revenue and the total assets at the Frankfurt Airport, including land, retail, development, airport facilities, and equipment totaled €9.5 billion.⁵¹ While aviation activities constituted the largest source of revenue for Frankfurt airport in 2013 with revenue of €845.2 million, retail and real estate had a 2013 revenue of €469 million and is likely to grow as the Airport develops additional retail and real estate on airport lands, including terminal expansions and development of new office parks and facilities such as the Squaire. Since 2009, the airport has invested over €4 billion in improvements to the airport to upgrade current facilities and increase passenger and cargo volume.

While Frankfurt Airport has heavily invested in improvements to the airport which enable it to remain a central passenger and cargo hub in Europe, noise complaints from local residents led German Courts to restrict nighttime flights. The Court ruling has negatively impacted passenger and cargo operations at the airport by reducing the available hours of operation and therefore capacity and volume at the airport. In direct response to the German Court’s decision, Lufthansa, the largest cargo operator at Frankfurt Airport, indicated it may relocate from Frankfurt to another airport without restrictions, citing that Lufthansa’s cargo unit estimated it would lose €40 million in annual earnings due to a ban on night flights.⁵² Lufthansa also

⁴⁹ Frankfurt Airport, “A Center of Purchasing Power” Accessed Jun 22, 2015.

⁵⁰ Fraport, “2014 Facts and Figures on Frankfurt Airport.” Accessed Jun 22, 2015.

⁵¹ Fraport, “Annual Report 2013, Frankfurt Airport behind the Scenes.” Accessed Jun 22, 2015.

⁵² Schafer, Daniel. “Infrastructure: Night flight ban threatens airport expansion” Financial Times. Jun 8, 2012.

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indicated that limitations on flight operations had reduced the desirability of Germany as a place to do business and would cause the airport to slip in international competitiveness.⁵³

As the Fraport Group is responsible to the German State of Hesse and the City of Frankfurt, who hold a combined majority share of stock of the airport, the dual responsibilities of local municipalities which balance airport operations against citizen preferences have shown that airport operations are secondary to the needs of local citizens and communities. In the instance of the airport, noise concerns voiced by the surrounding communities were of greater importance than the long-term operational success of the airport. Frankfurt's inability to conduct night flights may limit the success of additional real estate development adjacent to the airport, such as the Squaire, which is predicated on proximity and use of the airport as an advantage for industries to locate near Frankfurt Airport.

As cargo and passenger activity at Frankfurt Airport have been hampered by legal rulings, new trade groups have developed to promote the interests of local industries who rely upon the airport for their livelihood. The Air Cargo Community Frankfurt (ACCF) emerged in 2014 as a single voice to represent and promote the interests of companies at Frankfurt Airport, optimize the logistics process at the airport, and function as a single voice for the industry⁵⁴ in light of recent decisions limiting cargo growth and expansion at Frankfurt. With representatives from key cargo entities at Frankfurt Airport, including Air Canada Cargo, Emirates SkyCargo, and Lufthansa Cargo, the trade group has emphasized their desire to make Frankfurt the most advanced logistics hub in Europe by 2020.⁵⁵ Hampered by local political pressures, the airport and the Fraport Group have been unable to lead the development process, instead local trade groups have taken the lead in promoting the growth of industries and development at the airport.

⁵³ Schafer, Daniel. "Infrastructure: Night flight ban threatens airport expansion" Financial Times. Jun 8, 2012.

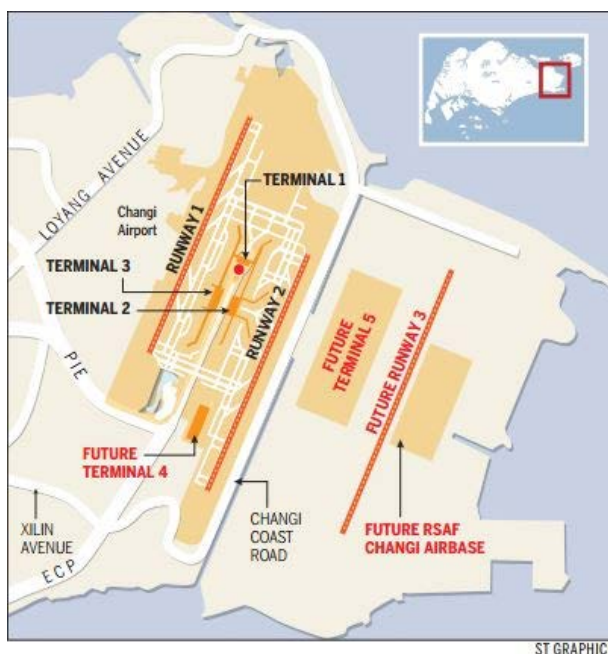
⁵⁴ AirCargoNews, "Frankfurt launches new cargo community" Jun 13, 2014.

⁵⁵ AirCargoNews, "Frankfurt launches new cargo community" Jun 13, 2014

SINGAPORE CHANGI INTERNATIONAL AIRPORT (SIN)

Singapore Changi Airport opened in 1981 and is a major transportation hub in Southeast Asia. It is located 10 miles outside the Singapore city center. In 2014, the ACI ranked Changi airport 16th in total passenger traffic worldwide with 54.1 million passengers. It was also ranked 6th in international passenger traffic and 13th in cargo traffic, handling 1.98 million tons in 2014. SIN was voted by passengers as the world's best airport in regards to the quality of its facilities, customer service, and 20 other metrics that measure customer satisfaction. The airport was also named the best airport for leisure amenities in 2015 according to passenger surveys conducted by Skytrax. SIN occupies five square miles of land and currently operates two passenger runways and three terminals, the most recent of which opened in 2008. Construction is underway on a fourth terminal that is expected to open in 2017, see Figure 3-20. A fifth terminal projected to handle 50 million passenger movements per annum is scheduled to open in the mid-2020s. Additionally, SIN's third runway, currently reserved for military use, will be extended and converted for use by passenger aircraft by 2020. Unique among airports, Changi airport is located on a peninsula which enables a majority of flights to land and take off on flight paths above water, reducing the impact of aircraft noise. Those flights which approach by land have developed flight paths where residential development has been prohibited.

Figure 3-20: Changi Airport Expansion Plans

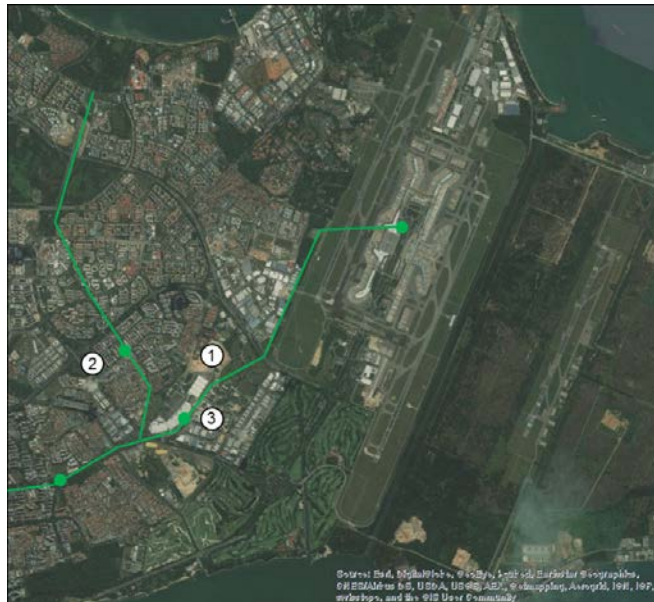


Source: ST Graphics & Changi Airport Group

Landside Development Activity

Changi Airport does not control additional land beyond what it requires for its airport operations. However, numerous developers have taken advantage of opportunities near the airport. These developments are described below and shown in context with the airport and rail transit in Figure 3-21.

Figure 3-21: Singapore Changi Airport, Surrounding Development, and Rail Transit



Source: Google Maps, Kimley-Horn, and HR&A Advisors

1. Singapore University of Technology and Design (SUTD)

- The Singapore University campus at Changi opened in January of 2015, (as rendered in Figure 3-22). The campus is 55 acres and includes sports facilities, student and staff housing, multiple classroom buildings, and research labs.
- SUTD's academic program is affiliated with MIT and offers co-teaching and student exchange opportunities with the Massachusetts University.

Figure 3-22: Singapore University of Technology and Design



Source: Sasaki Associates – Master Plan developers

2. Changi General Hospital

- As of FY 2013, Changi General had 862 beds in service and almost 5,000 people on staff. The hospital is in the midst of a nine year improvement program that began in 2011.

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- Along with the traditional general hospital, the medical campus includes additional facilities including a 9,000 square foot clinical trial center, 1,800 square feet of research labs, a Medical Center for International Travelers (providing pre- and post-travel care and offering vaccinations), Integrated Sleep Service (diagnosing and treating sleep disorders), and the Changi Sports Medicine Center.

3. Changi Business Park

- A 160-acre business park, first opened in 1977, comprised of high technology business, data and software enterprises, and research and development facilities. Tenants include Citibank, IBM, and Honeywell, among others. Changi City Point Mall is also within the business park and includes 140 retail stores.
- The Park is located about ten minutes from the airport, providing access to transportation and logistics facilities and the facilities are accessible by road and shuttle bus from the airport.
- Park users occupy land based on terms in a ground lease that last up to 30 years.

Figure 3-23: Changi Business Park



Source: Singapore Urban Redevelopment Authority

Residential Development

Singapore's high density development typology has led to the development of high density residential properties proximate to the Changi Airport, but no residential units are built along flight paths. The majority of residential developments in the area are high rise condominiums And numerous luxury units, built within the last 20 years, are available less than two miles from the airport. Furthermore, SIN's location on a peninsula allows the majority of flights to arrive and depart over water, lessening the impact of noise and enabling residential development to locate close to the airport. The small portion of land over which planes take off and land has been zoned for non-residential land uses. In addition, the Airport authority limits operations during early morning hours.

Theme Developments

Changi Airport and the Singapore government have made a joint and concerted effort to develop the airport as a strategic element of their plan to make Singapore one of the most prominent business hubs in

the world. This objective is clearly delineated in the airport's development plans as well as the plans for developments in its surroundings. For example, one of these developments includes:

Project Jewel, a new terminal concept under construction next to Terminal 1 and planned to open in 2018 and rendered in Figure 3-24. With five stories above ground and five below ground, the building will have a total footprint of more than 1.4 million square feet, provide improved check-ins and transfers for passengers, and will boost Singapore's appeal as a stopover point for travelers with high-end shops and a new 130 room hotel. The complex will also have the world's tallest indoor waterfall, a large indoor park with native trees and plants, and walking trails. Once complete, the project will enhance Changi's existing appeal to business travelers as a destination airport and is expected to increase passengers traveling through the airport.

Figure 3-24: Singapore International Airport, Jewel Project



Source: Changi Airport Group

Rail Access

Singapore's Mass Rapid Transit (MRT) system first opened in 1987 and the Changi Airport station, the terminus of the East West Line, opened in February 2002. Trains run on 10-15 minute headways from 5:30 a.m. to 11:00 p.m., with travel time to downtown Singapore is about 30 minutes. Average daily ridership of the MRT system increased by 90,000 users between 2002 and 2003- with some of this increase likely due to the opening of the airport station.

Policy Actions

Singapore's unique circumstances and land limitations demand judicious, comprehensive, and long-term planning. Planners in Singapore must ensure that all land use needs can be met, not only in the present but also in the longer term, in order to sustain growth and development in the years to come. This is achieved through the Concept Plan, a strategic land use and transportation plan which sets out Singapore's development directions for the next 40 to 50 years. The Concept Plan takes into consideration all major land use demands such as housing, industry and commerce, recreation and nature areas, transport and utility infrastructure, as well as defense requirements, and represents Singapore's planning strategies to make best use of its limited land resources. Commercial developments in Singapore and around the airport are all aimed at positioning Singapore as a global business hub.

Airport Economic Impacts

The Government of Singapore wholly owns and directs the Singapore Changi Airport through the intermediary of the Changi Airport Group (CAG) which oversees the day-to-day management, operations, commercial activities, and planning for the airport.⁵⁶ Through this management structure the success of the Singapore Changi Airport is a state priority and investments in the airport and its growth are seen as part of a national goal. In fiscal year 2012-2013, the Singapore Changi Airport employed 40,000 individuals and had an annual revenue of \$1.91 billion.⁵⁷ To maintain a competitive edge among international airports, continue to provide a dynamic passenger experience, and generate revenue to cover operating expenses, the Changi Airport Group has developed a robust and nimble retail program at the airport. In fiscal year 2012-2013 retail sales exceeded \$1.9 billion and the airport credits the success of their retail program by being innovative and nimble enough to respond to market needs, consisting of a unique retail mix which constantly introduces new retailers to the market and continuously introducing seasonal programs and experiences for shoppers in the airport.⁵⁸

For example, the development of Project Jewel, described previously, aligns with the Airport's goal of creating a dynamic passenger experience and generating revenue to cover ongoing airport expenses. In a joint venture agreement between the Changi Airport Group and CapitaMall Asia Limited, the Airport will invest \$1.47 billion in the project.

In addition to direct investments at the Airport to provide a competitive edge, the Government of Singapore is leveraging collaborative relationships between the airport and other state entities to further promote and utilize the airport as a tool for economic development and enhance the economic activity for the region.

- In 2015, the Changi Airport Group and Singapore Tourism Board entered into a \$35 million joint marketing initiative to promote local culture and flavor in the airport since it serves as a gateway to millions of passengers and potential visitors to Singapore.
- The Changi Business Park, developed by the JTC Corporation, the lead developer and manager of industrial property in Singapore, has promoted the proximity of the airport and downtown Singapore as a strategic advantage of locating in the business park.
- Changi General Hospital, owned by the City-State of Singapore has utilized the proximity of the Airport to promote medical tourism in Singapore and attract additional patients to the hospital. The Changi General Hospital has an International Medical Services division which is accredited to Joint Commission International Accreditation since 2005 to ensure that treatment is on par with international standards.⁵⁹ Aside from providing direct medical care to international patients, the hospital has developed a range of administrative support for patients to facilitate their visit, including interpreters, guidance on the visa system, to the identification of nearby hotels and lodging for family members.

As a state subsidiary, development at the Changi Airport is integrated with ongoing statewide initiatives to leverage a larger economic impact. Without residential development underneath the

⁵⁶ Changi Airport Group, "Frequently Asked Questions." Accessed Jun 22, 2015.

⁵⁷ Changi Airport Group, "Future Ready: Annual Report 2012/2013." Accessed June 22, 2015.

⁵⁸ Changi Airport Group, "Future Ready: Annual Report 2012/2013." Accessed June 22, 2015.

⁵⁹ Changi General Hospital, "Changi General Hospital (CGH) International Medical Services." Accessed on Jun 22, 2015.

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flight paths at Changi Airport, there are few sources of opposition to the planned expansion of the airport, which enables the long-term growth and economic role of the airport to continue unimpeded.

KUALA LUMPUR INTERNATIONAL AIRPORT (KUL)

Kuala Lumpur International Airport, located 28 miles outside of downtown Kuala Lumpur, opened in 1998. The airport has three runways and three terminals on a 39 square mile site. ACI ranked KUL 20th in total passenger traffic worldwide in 2014 with 48.9 million passengers. This only represents a three percent increase from 2013, but the airport saw a 19% increase in passenger traffic between 2012 and 2013. It was also ranked 13th in international passenger traffic and 28th in cargo traffic (854,000 tons in 2014). The latest major improvement at KUL was the construction in 2014 of a third terminal with capacity for 45 million passengers per year, designated for low-cost carriers.

Landside Development Activity

KUL owns over 6,700 acres of land that is available for development and can be utilized to further enhance the value of the Kuala Lumpur Airport. The airport plans to capitalize on this space and growing passenger volumes by eventually developing a 500,000 square foot outlet mall, the Mitsui Outlet Park KLIA Sepang, shown below in context with the airport and rail transit in Figure 3-25.

Figure 3-25: Kuala Lumpur International Airport, Surrounding Development, and Rail Transit



Source: Google Maps, Kimley-Horn, and HR&A Advisors

To develop the outlet mall, the Malaysian Airports Holdings (the airport) entered into a joint development agreement in August 2013 with Mitsui Fudosan Co Ltd, Japan to build and operate the Mitsui Outlet Park KLIA Sepang at a cost of \$89 million.⁶⁰ The Mitsui Outlet Park KILA Sepang will be constructed on 50 acres of land at the Kuala Lumpur Airport, and the ownership of the mall is 70% by Mitsui Fudosan Co and

⁶⁰ Kamalavicipini, R. "Mitsui Outlet Park to be ready next year." The Malaysian Reserve. Apr 30, 2014.

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the remaining 30% will be by Malaysia Airports Holding.⁶¹ Phase 1 of the project opened in May 2015, containing over 270,000 square feet with 140 outlet stores. By 2021, Phases 2 and 3 will increase the Outlet Park to a total of 500,000 square feet and 260 shops. The Outlet Park is envisioned as an anchor land use that will drive further commercial development and tourism growth in the vicinity of the airport. The Outlet Park offers upper-middle to high-end brand products at factory outlet prices. It caters to airport users by offering free shuttlebus service to the terminals, approximately four miles away. Additionally, shoppers have access to check-in kiosks, currency exchanges, free baggage storage, and a “tourist privilege pass” allowing foreign visitors to present their passport and receive coupons. Local shoppers are expected as well and will be accommodated by a 2,000-space parking lot. An early concept for the Outlet Park is shown in Figure 3-26. Due to its recent opening, data concerning the impact of the outlet park on passenger trips to KUL is not yet available.

Figure 3-26: Mitsui Outlet Park Concept - Outdoor



Source: Mitsui Outlet Park KLIA

The development of the Outlet Mall is seen as a positive for both parties since it enables Malaysia Airport to expand its operations and develop non-aero revenue streams, and the Mitsui Fudosan Co will have access to a target market of 8.7 million people who live within 100 kilometers of the outlet mall and 49 million annual airport passengers.⁶² In addition, the new Mitsui Outlet Mall serves as the initial development and pacesetter for development adjacent to the Kuala Lumpur Airport and the airport believes this development will boost the confidence of additional investors and developers in the potential of land around the airport.⁶³

Residential Development

The most recent land use plan of the over 6,500 acres of land owned by the airport does not show any residential developments directly under the airport runway flight paths. Since the airport controls all of the land, it has established a policy not to build or allow the construction of any residential development within the airport property.

⁶¹ Mitsui Fudosan, “Kuala Lumpur’s First Outlet Mall” Mitsui Fudosan Corporate and Group Information. Apr 28, 2015.

⁶² Dzaenis, “Mitsui Outlet Park KLIA Ground Breaking Ceremony.” Malaysia Travel News. May 2, 2014.

⁶³ Dzaenis, “Mitsui Outlet Park KLIA Ground Breaking Ceremony.” Malaysia Travel News. May 2, 2014.

Rail Access

The Express Rail Link (ERL), opened in 2002, connects Kuala Lumpur International Airport with the center of Kuala Lumpur. The express line travels directly to downtown Kuala Lumpur in 28 minutes and operates on 15 minute peak hour headways, while the commuter line stops at three intermediate stations before reaching the city and operates on 20 minute peak hour headways.

Policy Actions

The transformation of KUL into a retail hub was identified as an entry point project (EPP) in Malaysia's 2010 Economic Transformation Program (ETP). The goal of the ETP is to elevate the country to developed-nation status by 2020 by attracting \$444 billion (US Dollars) in investments to create 3.3 million jobs. An EPP is a project that explores new growth areas, and retail development around KUL is one of 149 EPP projects identified in the plan. The government's role in the ETP is to primarily facilitate the program, with the expectation that the private sector will finance 90% of investments. Further details on retail development around the airport were identified in MAHB's KLIA Aerotropolis master plan.

Airport Economic Impacts

The Kuala Lumpur International Airport is managed by Malaysia Airports Holding, which is a state subsidiary of the Department of Civil Aviation, and oversees the operations, management and maintenance of airports.⁶⁴ As one of several airports in Malaysia, the Kuala Lumpur Airport is a component of a diversified airport portfolio which enables well performing airports to bolster the Country's ability to provide airport service across the country. Therefore, the long-term success and profitability of the Kuala Lumpur Airport better enables the Country to adhere to their stated social responsibility of providing air access to rural and remote areas.⁶⁵

As one of 39 airports in Kuala Lumpur, the Kuala Lumpur Airport has been positioned by the state to serve as the key aviation hub for Southeast Asia, developing an airport which could combine short and long-haul connections, and focusing the development of low-cost carriers as a unique component of airport services to drive future growth and revenue for the airport system.⁶⁶ As a whole, the Malaysian airline company in 2013 employed 10,600 individuals, had a market value of \$3 billion dollars, and assets worth over \$6 billion dollars.⁶⁷

⁶⁴ Malaysia Airports, "Corporate Profile." Accessed Jun 22, 2015.

⁶⁵ Malaysia Airports, "Corporate Profile." Accessed Jun 22, 2015

⁶⁶ Malaysia Airports, "Corporate Profile." Accessed Jun 22, 2015

⁶⁷ Malaysia Airports, "The Centre of Excitement, Annual Report 2014." Accessed Jun 22, 2015.

IV. CONCLUSIONS

The HR&A Team developed the following key conclusions from its assessment of best practice case studies in airport affiliated development. One important overall finding is that there is not a singular “best practice” for compatible land uses around airports that provides the “right answer” to what the development direction should be in Loudoun County; rather Loudoun County should pursue airport-adjacent land uses that align with its regional economic strengths, market potential, and land-use policy goals. The case studies provide some key lessons learned from the land use patterns at other successful airport regions around the world.

Trends in Airport Adjacent Development

- Airport rail access has accelerated the pace of some developments next to stations, and in some cases created new ones, however, in most cases the developments would have happened regardless. This suggests that the extension of the Metrorail into Loudoun will enhance development, but not be the primary driver of future development potential.
- The economic characteristics of the region served by the airport are the most influential factors affecting land development patterns around the airport. This finding suggests that development around the Loudoun stations will be most influenced by trends in the broader County economy, not just the airport.
- The most common types of large development within the airport area include high levels of hospitality, office, retail, and logistics centers and exclude residential. The research did find a variety of specialty type developments such as high-end outlet malls, theme malls, pet hotels, health care clusters, and training facilities, although no one specialty is more common than the others. The proximity of the airport has a larger influence on the smaller and more specialized type developments that mainly serve airport users than on larger developments that serve a wider regional market. This finding suggests that development around the Loudoun stations will most likely need to include a broad mix of uses serving both airport users and the regional market.

Relationships between Airports and Residential Development

- Airports have nearly uniformly restricted or prevented residential development in the flight path. The scan of airport development patterns and case studies indicate that residential development at rail stations and in areas adjacent to airports is discouraged and generally prohibited if within the restricted residential noise contours zones. Several airport regions, including Dallas-Fort Worth, Denver International, and Frankfurt have sought to restrict any new residential development under flight paths in close proximity to the airports, including beyond the 65 DNL noise contours to avoid incompatibility between airport operations and residential development.
- The benefit of requiring development near airports to be compatible with airport operations include the avoidance of litigation, higher property values, and the economic benefits that come from the close proximity to airports.
- Residential development often creates conflicts between local jurisdictions that benefit from new development versus the local airport which must address the negative consequences of residential development affected by airport operations. Where these conflicts do exist, airports such as MSP have entered into mitigation consent decrees and Frankfurt has instituted a noise charge program that penalizes night-time flight operations and uses the revenue from this program to purchase residential properties in flight paths.

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- With FAA limits on residential development within noise contours, and the overwhelming body of evidence which indicates residential uses and airports are incompatible, our analysis did not find any planned residential development underneath airport flight paths or proximate to the airports.

Key Policy Drivers for Airport-Adjacent Development

- While there is a clear trend in recent policies by communities and neighboring airports to create more amicable and cooperative relationships for land development in and around airports, adversary relationships still prevail due to unaligned business interests. The best policies to improve these relationships and the development of lands in and around airports require the sharing of tax benefits from the developments between the airports and their surrounding communities. Successful advancement of plans for airport-compatible development to reality requires alignment between airport owners, local land use authorities, and major stakeholders.
- Many communities surrounding airports are in the very early stages of adopting the Aerotropolis model into local zoning and economic development plans because key stakeholders (local governments, airport authorities, and developers) are still working to understand what the concept means in practice. As a result, in the scan of comparable airports there were more examples of development in the planning phases than fully built out. The main exceptions that are further along in development are in Singapore and Kuala Lumpur, where there is common state-driven ownership of airports, airlines, and sponsorship of adjacent development. Loudoun County should continue to work closely with MWAA to facilitate development on and around Dulles that advances the economic interests of each entity.

In Section 4 of this report, the HR&A Team incorporates the conclusions from this airport best-practices analysis with the Team's findings from the market assessment in a series of policy recommendations for Loudoun County.

Section 4: Recommendations for Station Area Development

I. INTRODUCTION

The purpose of this section is to build on the findings from the market study and best practices analysis, and provide a set of recommendations to Loudoun County to guide development around the Loudoun Gateway (606) and Ashburn (772) Stations. Throughout this process, the Team has kept in mind the County's goals for development around the Silver Line Stations:

1. Prompt realization of tax revenues to support future Metrorail operations;
2. Maximizing future employment generation;
3. Achieving the desired land use pattern; and
4. Minimizing demands on the County's transportation infrastructure.

The HR&A Team's recommendations are made in the context that in the foreseeable future, Loudoun County will have three¹ Metrorail Stations located within its borders around which commercial development could occur. This stands in contrast to 10 stations in Fairfax County, 11 stations in Arlington County, 12 stations in Montgomery County, and 14 stations in Prince George's County. Throughout the Washington Metropolitan Region and nationally, commercial office locations that are transit-accessible have demonstrated advantages in terms of higher leasing interest and pricing. These trends indicate that the commercially-zoned land around Loudoun County's Station Areas is a limited and valuable resource for the County, and an opportunity for the County to capture future office tenants who seek a transit-accessible location. In addition, the County's three Metrorail Stations benefit from their proximity to Dulles Airport. However, much of the land surrounding the Loudoun Gateway Station lies in the Dulles flight path, which creates limitations on the types of uses that are compatible. Within the context of the County's goals, as well as the findings from the market and best practices analysis described in previous sections of this report, the HR&A Team provides the following recommendations regarding land use policy at these stations.

Each of the following recommendations includes a discussion of:

- Rationale and analysis that support the recommendation;
- Implications for and potential changes to Plan Policy and/or County Zoning;
- Impact on job creation; and
- Impact on tax revenue generation.

¹ One Metrorail Station will be located on MWAA land, two Metrorail Stations will be located on publicly developable land. The HR&A Team's analysis focused on Ashburn and Loudoun Gateway Stations which are located on publicly developable land.

II. RECOMMENDATIONS

Key Recommendation #1: Encourage the Transit Related Employment Center (TREC) policies in the Revised General Plan and maintain the Planned Development Transit-Related Employment Center (PD-TREC) zoning district for potential uses around the Loudoun Gateway Station to promote job-generating, airport-compatible uses.

Loudoun County implemented the TREC policies around the Loudoun Gateway (606) station as part of its Revised General Plan, which was originally adopted in 2001. The goals of this policy were to allow a mix of compact, employment-based development that would support transit, generate jobs, and be compatible with the airport environment. Subsequently, the PD-TREC zoning district was added to the Revised 1993 Zoning Ordinance. While this district currently exists and is available for applicant initiated rezoning applications, it has not been mapped anywhere in the County. Most properties within the Loudoun Gateway Station area are currently zoned PD-OP or PD-IP. For the purposes of this analysis, the HR&A Team has focused on the potential for these properties to be remapped to the PD-TREC district as the highest and best uses recognizing that additional potential does exist under currently mapped district.

The HR&A Team recommends the County maintain the TREC plan policies and PD-TREC zoning district for potential rezonings at the Loudoun Gateway Station to support the longer-term opportunity for commercial development that will create jobs, leverage the connection to Metrorail, and maintain compatibility with Dulles Airport.

Key findings from the HR&A Team's analysis which support this recommendation include:

- **Transit-accessible locations are more desirable office locations and command rent premiums, which would translate into higher property tax revenues to Loudoun County.** While the regional office market is currently challenged, a positive trend supporting the potential for future office development at Loudoun Gateway Station is the fact that transit-accessible office is outperforming the market overall and office tenants are willing to pay a premium for walkable locations with a mix of amenities and access to transit. In the past year, 92.3% of all office leasing transactions in the region have occurred within a half-mile of planned or existing Metrorail Stations.² Further, the average value of office space within a half-mile of Metrorail stations is 8.9% greater than the average value of office space greater than a half-mile from a Metrorail Station.³ These leasing trends are likely to continue, and the development of transit-accessible office at Loudoun Gateway will be more competitive than suburban locations in Loudoun County.
- **PD-TREC zoning and the Airport Impact Overlay (AI) prohibit residential development, which protects Dulles Airport from an incompatible use.** A majority of developable land within the TREC policy area falls within the 65 LDN noise contour.⁴ Following FAA recommendations, Loudoun

² Jones Lang LaSalle, "Metro DC Quarterly Office Sales Volume Tops \$1.5 B". April 2, 2015. Accessed at: <http://www.us.jll.com/united-states/en-us/news/3356/metro-dc-quarterly-office-sales-volume-tops-1b>

³ AECOM. "Making the Case for Transit: WMATA Regional Benefits of Transit." November 2011. Accessed at: <https://www.wmata.com/pdfs/planning/WMATA%20Making%20the%20Case%20for%20Transit%20Final%20Report%20Jan-2012.pdf>

⁴ The Loudoun County Airport Impact (AI) Overlay District zoning ordinance uses the acronym LDN to refer to noise level categories. According to the Revised 1993 Zoning Ordinance, AI-Airport Impact Overlay District § 4-1406 (A) (2015), LDN: The symbol for "yearly day-night average sound level", which means the 365-day average, in decibels, for the period from midnight to midnight, obtained after the addition of ten decibels to sound levels for the periods between 10 p.m. and 7 a.m., local time. The Federal Aviation Administration uses the acronym DNL (Day-Night Average Sound Level) to refer to the same noise categories.

County TREC policy and PD-TREC zoning prohibits residential development due to ongoing aircraft noise levels. As detailed in the case studies in Section 3, airport-adjacent residential development requires mitigation investments, often hampers airport operations, and decreases property values. The HR&A Team found that airports with nearby residential development had to invest in costly noise mitigation efforts, either involving changes to airport operations, modifications to residential homes to mitigate noise, or both. Frankfurt Airport in Germany has both altered flight operations by banning nighttime flights, and actively purchased residential properties under low flight paths to reduce the number of homes impacted by aircraft noise. These efforts have been costly for Frankfurt Airport and for cargo and passenger carriers based at Frankfurt. Lufthansa, one of the largest cargo carriers based at Frankfurt indicated the nighttime ban on flights would cost the company €40 million in lost annual revenue. These and similar issues of conflict between residential use and airport operations have occurred both within and outside 65 DNL contours at other airports.

- **Global trends for airport development follow an “Airport City” model and the Loudoun Gateway Station is well positioned to attract development that is affiliated with the airport.** The “Airport City” model positions an airport as a gateway to the regional economy to catalyze nearby commercial development for the benefit of the region. As described in detail in the case studies in Section 3 of this report, common elements of Airport Cities include a mix of office, retail, entertainment, and hospitality, along with industrial and logistics. Maintaining Loudoun County’s TREC policy and PD-TREC zoning for use at Loudoun Gateway would ensure a similar mix of commercial uses could emerge at the Station Area to leverage the proximity of Dulles Airport and catalyze economic growth for the region.
- **As the build-out period following the arrival of Metrorail takes several economic cycles, maintaining the TREC policy and PD-TREC zoning district now will help position the County to attract higher value, job-generating uses that are compatible with the airport environment in the future.** As detailed in the Team’s previous analysis in Section 2, “Competitive Position Among Regional Transit/Transportation Centers & Along the Silver Line,” full build-out at the Station Areas (particularly the Loudoun Gateway Station) will likely take several real estate cycles to achieve. Developers interviewed as part of the outreach for this report (See Attachment 4 in the Appendix) also indicated that they are interested in Station Area development, but have had difficulty advancing discussions with tenants without greater certainty around the Metrorail opening date and are not willing to advance projects speculatively.

An analysis of development trends around the Rosslyn and Ballston stations, seen in Section 2, illustrates the amount of time it takes for station areas to densify. The Team’s analysis indicates it has taken 35 years for development at the Rosslyn and Ballston stations to reach their relative office densities of 9.5 million square feet and 9.6 million square feet, respectively.

This report uses LDN when referring to the Loudoun County AI Overlay District zoning ordinance and DNL when referring to FAA rules.

- **Development at the Loudoun Stations may take a while to achieve.** With Metrorail currently expected to open in 2020, the County should not expect office development at the Station Areas sooner than one to two years after 2018 or 2019. This date would likely shift if the Metrorail opening date is further postponed. After the opening of the Metrorail, the County could expect the development and absorption of 1 million – 2.2 million square feet per five year period, for a total of 9 million square feet by 2040. This estimate is based on an analysis of trends at other stations and projected regional market conditions. See Section 2, Subsection IV. Real Estate Market Conditions for greater detail.

Plan Policy & Zoning Implications

The HR&A Team reviewed the County's 2001 Revised General Plan as amended through 2015 and the 1993 Revised Zoning Ordinance, to identify sections of the Plan or Ordinance that would require or potentially require modification to implement the Team's recommendations. Potential impacts to the Plan Policy and Zoning Ordinance are summarized in the following tables.

Figure 4-1: Plan Policy Implications of Land Uses at Loudoun Gateway Station

| Land Use | Plan Policy Implications at Loudoun Gateway |
|-------------|--|
| Residential | <p>Current County Policy</p> <ul style="list-style-type: none"> • With the exception of land owned by the Metropolitan Washington Airports Authority (MWAA), property within a half-mile of the Loudoun Gateway Station is governed by Keynote Employment, Route 28 Business, and TREC policies (<i>Revised General Plan, Chapter 6</i>). These policies all prohibit residential development. • The Loudoun Gateway Station is also covered by the Airport Noise Policies and includes land within both the 60 LDN and 65 LDN noise contours (<i>Revised General Plan, Chapter 5</i>). Under Loudoun County Plan Policy, residential development is prohibited in areas of 65 LDN or higher. Residential development in areas of 60 – 65 LDN is allowed as long as land owners dedicate an aviation easement to the MWAA allowing the right of flight to pass over the property. All residential properties constructed in the 60 – 65 LDN must undergo acoustical treatment and noise remediation efforts to ensure sound does not exceed a level of 45 dB, and all prospective purchasers must receive full disclosure in writing that their property is in an area that will be impacted by aircraft overflights and aircraft noise. <p>Required Changes to Plan Policy</p> <ul style="list-style-type: none"> • The HR&A Team does not recommend revising TREC policies to permit residential development. |

| Land Use | Plan Policy Implications at Loudoun Gateway |
|------------|---|
| Commercial | <p>Current County Policy</p> <ul style="list-style-type: none"> Current County Policy at Loudoun Gateway allows a mix of land uses including regional office, light industrial, special activity uses, commercial retail and services, public parks, and civic and open spaces. Land can be developed according to Keynote Employment, Route 28 Business, or TREC overlay policies. <p>Required Changes to Plan Policy</p> <ul style="list-style-type: none"> No changes other than what is described for “anchor” uses and “interim” uses (see Key Recommendations #3 and #5). |

The following table provides an overview of the potential zoning implications of different land uses at the Loudoun Gateway Station and the Team’s recommendations for revisions to current County Ordinances.

Figure 4-2: County Zoning Implications of Land Uses at Loudoun Gateway

| Land Use | Zoning Implications at Loudoun Gateway |
|-------------|--|
| Residential | <p>Current County Zoning</p> <ul style="list-style-type: none"> Land at Loudoun Gateway is generally zoned PD-OP or PD-IP with the option of rezoning to PD-TREC. These districts prohibit residential development. The Station Area is also under the County’s Airport Impact Overlay District which similarly prohibits residential development. The Airport Impact Overlay District (AI) (<i>Revised 1993 Zoning Ordinance, Section 4-1400</i>) is consistent with this PD-TREC zoning. <p>Required Changes to Zoning</p> <ul style="list-style-type: none"> The HR&A Team does not recommend changes to the PD-TREC zoning district to permit residential development. Furthermore, the HR&A Team recommends maintaining the current boundaries of the AI District. Any residential development that occurs in this area should conform to the requirements of the AI District and use other appropriate zoning districts. |

| Land Use | Zoning Implications at Loudoun Gateway |
|------------|--|
| Commercial | <p>Current County Zoning</p> <ul style="list-style-type: none"> Loudoun Gateway is generally zoned PD-OP or PD-IP with the option of rezoning to PD-TREC to support a mix of compatible uses in a high-density, walkable, and transit-accessible location. County zoning allows for a combination of office, retail, light industrial, and civic uses as enumerated in the County’s Zoning Ordinance. <p>Required Changes to Zoning</p> <ul style="list-style-type: none"> No changes other than what is described for “anchor” uses and “interim” uses (see Key Recommendations #3 and #5). The PD-OP district allows employment and some retail and service uses, which could result in desirable development. However, it also allows data centers, which would not be desirable. |

Impact on Job Generation

Due to current real estate market conditions, commercial development may take longer to emerge at the Loudoun Gateway Station than residential development (if it were allowed under County Plan Policy). In the long run, however, commercial development will have a larger positive economic impact in Loudoun County than residential development. As shown in the table below, commercial development at Loudoun Gateway will generate more permanent jobs than residential development, which would only support a limited number of generally lower-paid jobs associated with home maintenance and home services. Encouraging commercial development over residential development will maximize the employment opportunities at Loudoun Gateway, and help the County achieve its goals for development at the Silver Line Station Areas.

Figure 4-3: Relative Job Creation by Land Use at the Station Areas⁵

| Land Use | Relative Job Generation^{6 78} |
|------------------------|--|
| Office | High: 4 – 5.5 jobs per 1,000/SF. Low demand for office space in Loudoun County suggests office jobs may be slow to emerge in Loudoun County. |
| Retail | Moderate: 1.5 – 3 jobs per 1,000/SF. High demand for retail development in Loudoun County suggests retail development could quickly create jobs. |
| Residential | Low: Limited home maintenance and support positions would be created through residential development. |
| Hotel | Low: 1- 1.2 jobs for every 1,000/SF. A hotel use would create a mix of entry-level and some management positions in Loudoun County. |
| Industrial/Flex | Moderate: 1 – 2.2 jobs per 1,000/SF for industrial space. 3 – 4 jobs per 1,000/SF if flex space is utilized for research or incubator uses similar to an office. Ongoing speculative development of Industrial/Flex space in the County indicates demand for Industrial/Flex development which could quickly create new jobs in Loudoun County. |

Impact on Tax Revenues

Key sources of revenue to the County from commercial development will come from property taxes. Sales taxes may also be generated, but the revenue potential will depend on the amount and type of retail developed as part of a project with multiple uses. Due to the weaknesses in the market for commercial office development, it will take longer to realize revenues from commercial office development than residential development (if allowed at Loudoun Gateway), but on a net basis the overall fiscal benefit of commercial development exceeds the fiscal benefit of residential development due to the higher service costs associated with residential development.

Commercial development at the Station Areas has the potential to generate ongoing property tax revenues for Loudoun County. The County's Metrorail Service District provides for additional tax assessment on all real property within the District boundaries (covering both Station Areas) to fund Loudoun County's contribution towards the construction of Metrorail. The following table provides an estimate of the relative fiscal benefits by land use under the current County Assessment and with the additional Metrorail Service District Assessment to provide an overview of the potential property tax revenues per square foot by land use.

⁵ The HR&A Team evaluated both national and local data sources to determine a potential range of jobs created per 1,000 SF by land use in Loudoun County. The Team consulted estimates from the U.S. Green Building Council, CoStar, and Loudoun County's 2013 Fiscal Impact Committee Guidelines.

⁶ Loudoun County Board of Supervisors Fiscal Impact Committee. "2013 Fiscal Impact Committee Guidelines: Demographic, Economic, and Fiscal Assumptions and Forecasts." February 2014.

⁷ U.S. Green Building Council. "Building Area Per Employee by Business Type." Accessed July 2015 at: <http://www.usgbc.org/Docs/Archive/General/Docs4111.pdf>

⁸ Heschmeyer, Mark. "Changing Office Trends Hold Major Implications for Future Office Demand." CoStar News, Mar 13, 2013. Accessed at: <http://www.costar.com/News/Article/Changing-Office-Trends-Hold-Major-Implications-for-Future-Office-Demand/146580>

Figure 4-4: Relative Tax Revenues by Land Use at the Station Areas

| | Relative Tax Revenues |
|------------------------|--|
| Office | High: \$3.90 – \$4.10/SF in property taxes (includes an 18% increase per SF for the application of the Metrorail Service District Assessment). ⁹ With limited office development it may be several years before new office generates tax revenue for Loudoun County. |
| Retail | High: \$6.30 – \$6.50/SF in property taxes (including an 18% increase per SF for the application of the Metrorail Service District Assessment). ¹⁰ Demand for additional retail would support new retail development and generate tax revenues for the County. |
| Residential | Moderate: \$2.70 – \$2.90/SF in property taxes (including an 18% increase per SF for the application of the Metrorail Service District Assessment). ¹¹ The value of higher-density housing at the Ashburn Station may offset the County's cost of services for additional residents. |
| Hotel | Low: \$2.20 – \$2.40/SF in property taxes (including an 18% increase per SF for the application of the Metrorail Service District Assessment). ¹² Hotels in Loudoun County also collect a 5% Transient Occupancy Tax on hotel room nights, which increases the relative fiscal value of hotel development. |
| Industrial/Flex | Low: \$2.2 – \$2.40/SF in property taxes (including an 18% increase per SF for the application of the Metrorail Service District Assessment). ¹³ |

⁹ Office values are based on CoStar's average market value/SF of Class A office in Loudoun County with an 8.9% premium on market value due to proximity under a half-mile to the future Metrorail Station. Property taxes were determined using CoStar's Class A market value of \$276/SF.

¹⁰ Retail values are based on CoStar's combined average market value of \$480/SF for existing regional, super regional, lifestyle and power center retail in Loudoun County.

¹¹ Market value for residential land use in Loudoun County is based on Zillow's median sales price for Condos and Co-Ops of \$210/SF.

¹² Market Value based on an analysis performed by HR&A to identify the value of new hotels in Loudoun County near Dulles Airport and comparable hotels in Tysons Corner near the new Metrorail station. HR&A's analysis determined a market value of \$175/SF for potential new hotel development.

¹³ Market values for industrial/flex uses in Loudoun County are based on CoStar's average market value of existing flex and industrial uses within two miles of the Loudoun Gateway Station. Property taxes were determined using a market value of \$171/SF for industrial/flex uses.

Key Recommendation #2: Start to consider a partnership between a private developer and a public entity (County, State, and/or MWAA) to pursue a catalytic anchor, if applications for commercial development consistent with TREC Plan Policy have not started to materialize within two years after the Metrorail opening date at Loudoun Gateway.

The HR&A Team assessed the market potential for a catalytic anchor use at the Loudoun Gateway Station by conducting a market scan for six potential uses that could stimulate additional development.

Given the near-term challenges to regional office development and County policy and zoning that prohibit residential development at the Loudoun Gateway Station, the HR&A Team recommends the County provide more flexibility to land uses at Loudoun Gateway by considering proposals for appropriate catalytic anchor uses at this station if market conditions do not change after the station opening. Such an anchor would help stimulate development and create a brand for the station, further increasing the overall economic activity in the station area. The HR&A Team's study analyzed six potential catalytic anchor uses, including a convention center with hotel; destination retail, entertainment, and hotel; research center; tech incubator; sports and recreation facility; and a professional sports stadium. Team recommendations for the development of each catalytic anchor use can be found in Section 2.

Key findings which support the Team's recommendation include:

- **Loudoun Gateway differs from other station areas across the Metrorail system with its relatively consolidated land ownership, creating an opportunity for a large anchor development.** Compared to other station areas in the Metrorail system, Loudoun Gateway is undeveloped and has relatively few landowners which simplifies site control and facilitates development. Under these conditions, Loudoun County could facilitate the private development of a large-scale catalytic anchor use that other Metrorail station areas are precluded from developing due to limited land availability and ownership patterns. The County's support in developing a coordinated development vision and strategy by working more closely with property owners may enable a large anchor use to be developed more quickly than a number of smaller commercial development projects, which may be more influenced by market conditions.
- **Developments at several Metrorail stations have successfully used branding tactics to differentiate themselves in the market.** The Pike and Rose Development near the White Flint Metrorail Station is introducing higher-density mixed-use development in an auto-centric suburban area and has created the active branding strategy, "So Happy Together" to differentiate the development. Through the branding strategy, the developer is connecting residential development with adjacent retail and programming to create a unique experience for the community. In station areas with developed identities, such as the forthcoming Reston Town Center Metrorail Station, developers around the future station area are leveraging the existing reputation of Reston Town Center as a way to brand their new development and create a positive branding for potential tenants. See Section 2 of this report, "Competitive Position Among Regional Transit/Transportation Centers" for additional detail.

- **Strong population growth and high household incomes in Loudoun County could support new commercial development at the Loudoun Gateway Station, and complement current retail and entertainment development in Loudoun County.** As detailed in the Team's analysis in Section 2, "Assessment of Regional & Local Demographic & Economic Factors", population growth and high household incomes could support additional retail and entertainment uses in the County. The development of new retail, entertainment, and other commercial uses at Loudoun Gateway could capture local demand and leverage Metrorail access to attract shoppers and visitors from the region and Dulles Airport. Facing stiff competition from established regional competitors such as Tysons Corner, Leesburg Corner Premium Outlets, Dulles Town Center, One Loudoun, and a number of community retail centers along Route 28, new commercial uses would have to create an experience which is unlike current destinations, and in doing so, create a unique reputation for Loudoun Gateway.
- **The HR&A Team's analysis of anchor uses indicated public investment and/or tax abatement are often required to support catalytic anchor uses due to their unique position in the market which increases development risks for a private developer.** Frequently-used public incentives include site infrastructure investments or tax-abatements for a period of time. Section 2 provides an assessment of the market for catalytic uses, as well as an evaluation of catalytic uses versus policy goals. Even if the County does not provide a public incentive towards the development of an anchor use, the County should take an active role in coordinating with land owners and private developers to ensure the development of an anchor use is implemented and cited at the Loudoun Gateway Station in a way which facilitates ancillary development and promotes long-term development that is consistent with TREC policy.
- **The County should require additional documentation of the benefits and impacts of a specific proposed catalytic anchor use that requires either a change to Plan Policy and/or Zoning, or requires public incentives.** As summarized in Section 2, "Catalytic Anchor Use Compatibility with County Development Goals", certain catalytic anchor uses may already be consistent with Plan Policy and/or Zoning, or may be commercially feasible. If a developer requires action or support from the County, then the benefits to the County associated with this action should be well-documented. Additional documentation and studies should include a detailed market feasibility study for the catalytic anchor use, impact studies which assess the development's potential fiscal and traffic impacts, and an analysis to indicate how future adjacent PD-TREC development at Loudoun Gateway may be impacted.

Plan Policy & Zoning Implications

The HR&A Team evaluated a number of potential catalytic anchor uses at the Loudoun Gateway Station Area along with possible implications for Plan Policy and the current Zoning Ordinance which may require modifications to enable some of the proposed uses. Current TREC Plan Policy recommends the development of a Special Activity use at the Loudoun Gateway Station, but does not indicate specific uses the County would encourage at Loudoun Gateway. The HR&A Team recommends revisions to TREC Plan Policy that would clarify specific anchor uses the County deems appropriate at the Loudoun Gateway Station. The Team also recommends limiting County investment, either direct or through subsidy, in the development of a catalytic anchor use until two years after the opening of the Metrorail Stations to give private commercial development the opportunity to emerge at the Station Areas.

If Plan Policy is revised to support specific anchor uses at the Loudoun Gateway Station, the following table is an overview of current PD-TREC zoning standards and the required zoning changes that would enable the development of specific catalytic anchor uses.

Figure 4-5: Implications to the County's Zoning Ordinance at the Loudoun Gateway Station

| Catalytic Anchor Use | Zoning Implications at the Loudoun Gateway Station |
|--|--|
| Convention Center & Hotel | <p>Current TREC Zoning Standards</p> <ul style="list-style-type: none"> A convention or conference center is an allowed use within both the Inner Core (within a ¼ mile from the outer edge of the planned transit station) and Outer Core (within a ½ mile from the outer edge of the planned transit station). Hotels, with interior accessible rooms and enclosed circulation, stairwells, and corridors are also permitted under the PD-TREC zoning. <p>Required Changes to Zoning</p> <ul style="list-style-type: none"> The County's Zoning Ordinance allows the development of hotels and a convention and/or conference center. No changes are required to the County's Ordinance. |
| Destination Retail, Entertainment, & Hotel | <p>Current TREC Zoning Standards</p> <ul style="list-style-type: none"> Within the Inner and Outer Core the following uses are allowed under current the PD-TREC zoning and could be a component of a vibrant destination retail and entertainment experience: <ul style="list-style-type: none"> Art Gallery; Cultural amenities, such as fountains and ice rinks; Museum or cultural center; Performing Arts Center under 10,000 SF; Restaurants, including dine in, carryout, and fast-food establishments; Dinner theater; Retail sales establishments under 15,000 SF; Indoor Recreation Establishment under 10,000 SF; Indoor theater; and Outdoor amphitheater. Drive-through facilities are prohibited uses. <p>Required Changes to Zoning</p> <ul style="list-style-type: none"> Development of the following uses would require a special exception: <ul style="list-style-type: none"> A special exception would be required to construct a Performing Arts Center which is greater than 10,000 SF. |

| Catalytic Anchor Use | Zoning Implications at the Loudoun Gateway Station |
|------------------------------|--|
| | <ul style="list-style-type: none"> ○ A special exception would be required to construct an indoor Recreation Establishment, such as a bowling alley or indoor theme park and arcade which exceeded 10,000 SF at the Loudoun Gateway Station Area. ○ Large format, free standing retail over 15,000 SF, such as a department store, is not allowed under the PD-TREC zoning. The Team recommends changes to the zoning to specifically allow uses over 15,000 SF as a component of a large retail and entertainment destination with performance standards. |
| Research Center | <p>Current TREC Zoning Standards</p> <ul style="list-style-type: none"> • A research center in an enclosed building with the primary objective of conducting general research, scientific research, development or training, where assembly and integration/testing of products is secondary is an approved use within both the Inner and Outer Core under PD-TREC zoning. <p>Required Changes to Zoning</p> <ul style="list-style-type: none"> • The development of a research center is allowed under current County Zoning and does not require any changes to the Ordinance. |
| Tech Incubator | <p>Current TREC Zoning Standards</p> <ul style="list-style-type: none"> • The development of a tech incubator housed in a traditional office building is an allowed use in the Inner and Outer Core under the current PD-TREC land use. <p>Required Changes to Zoning</p> <ul style="list-style-type: none"> • The development of a tech incubator within a traditional office building is allowed under County Zoning and does not require any changes to the Ordinance. |
| Sports & Recreation Facility | <p>Current TREC Zoning Standards</p> <ul style="list-style-type: none"> • Under PD-TREC zoning, an indoor recreation facility is permitted in the Inner and Outer Core if the facility is a minimum of three stories in height, has two or more distinct principal uses that do not share the same physical space and is not more than 10,000 SF. • Outdoor sports fields as part of sport and recreation center are not enumerated as an approved use at the Loudoun Gateway Station Area. |

| Catalytic Anchor Use | Zoning Implications at the Loudoun Gateway Station |
|-----------------------------|--|
| | <ul style="list-style-type: none"> Currently recreational fields are a permitted use in a County floodplain and may be compatible with the Broad Run Flood Plain. <p>Required Changes to Zoning</p> <ul style="list-style-type: none"> A special exception is required for an indoor recreation facility which differs from enumerated uses, such as the construction of a facility that is larger than 10,000 SF. The HR&A Team recommends a revision to the PD-TREC zoning that allows the inclusion of outdoor athletic fields. |
| Professional Sports Stadium | <p>Current TREC Zoning Standards</p> <ul style="list-style-type: none"> A stadium or arena is allowed through a Special Exception in the Outer Core land (>1/4 mi from station) area under the current PD-TREC zoning. <p>Required Changes to Zoning</p> <ul style="list-style-type: none"> The development of a stadium or arena is allowed under current County Zoning and does not require a change to County Ordinances. While consistent with current Plan Policy, the development of a professional sports stadium would likely preclude additional PD-TREC development at the Loudoun Gateway Station and requires additional study to evaluate the potential merits of development. The HR&A Team recommends a detailed study of a stadium use at the Loudoun Gateway Station, including a feasibility assessment, a traffic impact study, Metrorail-ridership and compatibility and the stadium's potential impact on surrounding development at Loudoun Gateway. |

Impact on Job Generation

The relative ratio of jobs to square feet of development generated by an anchor use would likely be similar to the number of jobs created by commercial development opportunities at the Station Area, as shown in Figure 4-3: Relative Job Creation by Land Use at the Station Areas. Depending on the relative size of the anchor development, it could generate a higher total number of jobs more quickly than a commercially-led development due to a faster construction period. However, the creation of direct jobs from a catalytic anchor use would likely be within retail, service, or hospitality sectors, which tend to have higher percentages of lower wage positions that are part-time or seasonal. In comparison, the development of office at the Station Areas would likely generate higher density, higher wage, full-time positions. The County should evaluate the potential trade-offs, and desired mix of jobs at the Station Areas as part of a more intensive study of any individual proposed anchor use. The development of a catalytic anchor use could enable the County to achieve two development goals of maximizing future employment opportunities and quickly generating tax revenues to support future Metrorail operations.

Impact on Tax Revenues

While development of a catalytic anchor would likely stimulate additional development at the Station Areas more quickly than development without an anchor, it will potentially generate lower revenues to the tax district, due to the incentives likely required to develop an anchor use. Therefore, a detailed analysis of implications should be considered before approving the development of an anchor use.

To assist in the evaluation of public costs and benefits of various anchor uses, the HR&A Team recommends all anchor uses undergo a development feasibility analysis, a traffic and fiscal impact study, and an assessment of the implications for future adjacent PD-TREC development at Loudoun Gateway. Applicants wishing to develop an anchor use that requires a change to Plan Policy and/or Zoning or the contribution of public funds should complete this study.

Key Recommendation #3: Work with MWAA to encourage airport-compatible development around the Loudoun Gateway Station, building on national trends favoring “Airport City” models of development near airports.

The HR&A Team recommends establishing a development partnership and agreement between MWAA and the County to position areas adjacent to Dulles Airport, including public and private land at the Loudoun Gateway Station Area, as an “Airport City” that could attract airport-affiliated development and create economic benefits for both the County and MWAA.

Key findings which support the Team’s recommendation include:

- **The “Airport City” model of development is gaining prominence as an opportunity to spur the regional economy and stimulate additional growth.** Under this model, Dulles Airport could be better positioned as a gateway to the regional economy and could serve as a catalyst for nearby commercial development, which oftentimes occurs on airport property to best leverage proximity to the airport. The HR&A Team’s Analysis in Section 2, “Airport-Adjacent Development Trends,” indicated that typical uses near the airport included logistics, office, retail, exhibition and convention uses, which benefited from proximity to the Airport, and provided value for the airport’s passengers, airlines, businesses, and nearby communities. Under this model, land owned by both Dulles Airport and private landowners, adjacent to the Loudoun Gateway Station, would become a critical location for commercial development and enable a large-scale development program that could leverage proximity to Metrorail and Dulles Airport.
- **Airport authorities and surrounding communities are entering into development agreements to promote proactive land use planning and align financial interests.** As discussed previously in Section 3, “Key Trends in Airport Adjacent Development,” several U.S. airports have developed agreements with surrounding jurisdictions to establish land use guidelines and revenue sharing streams to facilitate a collaborative relationship. The Team’s case study analysis found that airports have typically led the way in identifying and supporting airport-compatible development on and off of airport land. The case study for Dallas/Fort Worth in Section 3 is an example of an Airport City model where the airport has utilized a master plan for 6,600 acres of airport-owned land, while simultaneously developing an Interlocal Agreement with the surrounding jurisdictions to encourage compatible land use on airport-adjacent land. Similar to Dallas/Fort Worth, MWAA could take a leadership role in identifying potential land uses and tenants which would be interested in developing on airport- and privately-owned land near the Loudoun Gateway Station. For instance, in the Dallas/Fort Worth Case Study, the Southgate Plaza Development was anchored by the Airport Authority’s 150,000 square foot corporate headquarters building. Similar office anchor uses could be encouraged by MWAA on airport-owned land or privately-owned land at the Loudoun Gateway Station.
- **Development agreements can be structured with the flexibility to adapt to changing market conditions.** Denver International Airport entered into an Inter-Agency Agreement (IGA) with neighboring Adams County to share the economic benefits from airport operations with the County. The IGA for Denver was developed in 1988, prior to the development of the airport, and sought to regulate land use, airport orientation, and a number of development outcomes to ensure that future economic benefit from the airport would be equitably shared. Since the inception of the

agreement in 1988, it has been periodically revisited and updated to better reflect changing market conditions and ensure that the agreement is best protecting and promoting the interests of all parties. A similar development agreement with MWAA and Loudoun County could help both entities identify the long-term economic opportunities of development around the Loudoun Gateway Station Area and establish stronger land use policies under the County's TREC policy to protect the economic growth of Dulles Airport. By identifying the long-term economic benefit of a development strategy at the Loudoun Gateway Station, along with potential financial incentives to maintain policies in the land use plans, the County would be better able to protect and promote airport-compatible land use at the Loudoun Gateway Station in light of changing and sometimes challenging market conditions.

Plan Policy & Zoning Implications

The County's TREC Plan Policy should be revised to encourage coordinated efforts with MWAA to identify and promote development that is mutually beneficial to MWAA and the County.

Impact on Job Generation

Coordinating development with MWAA could unlock a larger development opportunity around the Loudoun Gateway Station, which could generate additional jobs at a faster rate than would happen without coordination.

Impact on Tax Revenues

MWAA's leadership to develop commercial uses on airport-owned land would increase tax revenue in Loudoun County as the County collects tax revenue from development on airport land. Additional coordination between MWAA, Loudoun County, and private developers could accelerate development at the Loudoun Gateway Station, enlarge the area for potential development, and ensure mutually beneficial development occurs which provides a steady stream of revenue for Loudoun County.

Key Recommendation #4: Continue to pursue commercial development at the Ashburn Station Area.

The HR&A Team recommends the County continue to pursue commercial office development at the Ashburn Station Area because it will complement the residential uses that are currently being developed, achieve a premium over non-transit accessible office locations, and help enhance the County's image as an attractive location to live, work, and do business.

Key findings supporting the HR&A Team's recommendations include:

- **Due to the Station Areas' forthcoming Metrorail access, office development at the Ashburn Station will be more competitive for tenants than non-transit accessible office locations in Loudoun County and will likely capture more regional demand and achieve higher rents and lower vacancy rates.** The Northern Virginia office market had a vacancy rate of 18.2% in Q1 2015 and pipeline reports indicate there are 2.1 million square feet of office under construction.¹⁴ As described in more detail in Section 2, the office market in Loudoun County will likely continue to remain challenging and new office development will be limited to build-to-suit tenants until vacancy rates fall below 10% in competitive submarkets. However, when this demand materializes the Team forecasts that commercial office uses at the Station Areas will likely attract more tenants, maintain higher occupancy, and be considered a stronger location for additional office development than other office locations in Loudoun County that are not transit accessible. As discussed in Section 2 of this report, in the Washington Metro Region, commercial office uses within a half-mile of Metrorail Stations have an 8.9% premium of average property values over non-transit accessible office locations.¹⁵
- **Furthermore, Metrorail stations with high-density development typically include a mix of commercial office, retail, residential, and entertainment uses.** The mix of uses, walkability, and density has contributed to the success of stations in places such as the Rosslyn-Ballston corridor, where during a strong real estate cycle, prior to national recession of 2007-2009, the Rosslyn-Ballston corridor produced 33% of the County's real estate tax revenue while being only 7.7% of the County's land.¹⁶ Recent trends in office development have seen changing preferences towards mixed "live-work" communities with office adjacent to residential uses. The existing residential and retail development in a dense, walkable environment at the Ashburn Station will make it attractive to office tenants as the regional office market improves.
- **While a strong residential market in Loudoun County has encouraged private developers to rezone land for additional residential development, the County should preserve the mix of uses envisioned under Transit Oriented Development policies at the Ashburn Station.** Low residential vacancy rates in the County have encouraged private developers to submit rezoning applications to increase the development of residential units in Loudoun County, such as the Toll Brothers' Belmont Executive Center or the Tuscarora Crossing Development. See Section 2, "Real Estate Market Conditions," for additional information. However, Loudoun County's Transit Oriented Development (TOD) policy was developed to allow a high-density, pedestrian friendly

¹⁴ CBRE Marketview, Northern Virginia Office Submarket Report, Q1 2015.

¹⁵ AECOM. "Making the Case for Transit: WMATA Regional Benefits of Transit." November 2011.

¹⁶ Arlington County. "Rosslyn-Ballston Corridor Arlington, VA. 30 Years of TOD: Community Outcomes & Performance Measurement." Accessed July 2015 at: http://www.dullescorridorail.com/pdf/tod_leach_arlco.pdf

environment with a mix of commercial and residential development that would benefit from transit accessibility and the County should preserve a balance between residential and other uses. Residential development is outperforming other development at the Ashburn Station with new multi-family development with a vacancy of 1.1% compared to an office vacancy of 46.6% and retail vacancy of 7.9%. However, the combination of residential, office, retail, and additional commercial uses will create 24/7 activity at the Ashburn Station, develop a more vibrant destination, and create higher economic activity in the long term. While short-term development may favor a higher concentration of residential development, adhering to the long-term development vision of the TOD policy with a mix of uses will generate greater economic value.

Plan Policy & Zoning Implications

The HR&A Team does not recommend any changes to the Revised General Plan for the planned Transit Oriented Development at the Ashburn Station or changes to the Revised 1993 Zoning Ordinance related to the amount of commercial development allowed at the Station. The Team does recommended changes to the Plan Policy and Zoning Ordinance that would allow “interim uses” as discussed further under Recommendation #5.

Impact on Job Generation

The HR&A Team evaluated the relative job density by land use that could be expected at Loudoun’s Ashburn Station Area. Assessing the relative job creation by land use provides a metric to evaluate the merits of different land uses in the Station Areas. The Team’s analysis of relative job creation can be seen in Figure 4-3: Relative Job Creation by Land Use at the Station Areas, which appeared earlier in this section. Job creation by land use would be comparable at the Loudoun Gateway and Ashburn Stations.

Impact on Tax Revenues

Commercial development at the Ashburn Station Area has the potential to generate ongoing property tax revenues for Loudoun County. The County’s Metrorail Service District provides for additional tax assessment on all real property within the District boundaries (covering both Station Areas) to fund Loudoun County’s contribution towards the construction of Metrorail. Estimates of potential tax revenues on a per square foot basis are included under Recommendation #1, Figure 4-4.

Key Recommendation #5: Allow interim uses¹⁷ to help activate the two Station Areas studied, provide income for property owners, and generate tax revenues. These interim uses should be positioned to be efficiently and easily redeveloped (or converted to another use) when the market for commercial development improves.

Loudoun County has established plan policies and zoning to promote high-density development in the Station Areas that will leverage transit accessibility. As demonstrated in the market analysis, development around existing stations in the Metrorail system, in most cases, has taken years and several economic cycles to achieve plan goals.

Thus, the HR&A Team recommends that the County allow interim uses as a way to create some economic activity in the Station Areas, produce jobs, and generate tax revenues in the near term while preserving opportunities for the high density development envisioned in the longer term. The development of interim uses would need to be facilitated through special exception permits with sunset clauses or some other means of insuring the removal of the use and in conjunction with a rezoning to the ultimate TREC development plan. In addition to a market driven assessment of each interim use, the County should consider the physical components of interim developments at the Station Areas to ensure the interim use can be easily redeveloped. Physical redevelopment and site infrastructure considerations include:

- **Reserving key parcels for future development.** Due to location or site features, some parcels will play a more important role in the success of future development than other sites. Clearly identifying strategic parcels will help prioritize development decisions and shape the long-term development plan for an area.
- **Preserving right-of-way and other land to support future build-out and transition of use.** The County should ensure that utilities, streets, and other site infrastructure is either constructed or ensured through easements or conditions to facilitate the eventual redevelopment of sites for new uses.
- **Setting building locations, scales, and masses that permit conversion from one use to another.** Planning ahead for the scale, citing, and massing of buildings will ensure that future redevelopment of the sites will not be impeded by the presence of sites which have not been developed into a permanent use.
- **Encouraging building types that can be easily disassembled.** This approach helps ensure it is cost effective to redevelop the property by avoiding expensive demolition.
- **Locating utilities to prevent relocation for future development.** Utilities are often an expensive infrastructure cost to prepare a site for development. Placing utilities in strategic locations which could support future uses will increase the value of future land and save developers time and money during the development of a permanent use.
- **Sizing or preparing utilities to efficiently adapt to future needs.** The utility capacity of different buildings and their uses will affect the infrastructure necessary to support building operations. By sizing utilities to be adaptive to a range of needs, a site can be efficiently used for a number of uses without drastically increasing infrastructure and site preparation costs.
- **Discourage permanent uses.** The development of uses that require a large capital investment from users, such as data centers with extensive IT infrastructure and associated utility upgrades or

¹⁷ Interim uses refer to uses allowed through a special exception permit with a sunset period to facilitate future development that is better aligned with the County's goals.

facilities with heavy mechanical uses, should be discouraged as the high level of initial capital associated with the use decreases the likelihood of later redevelopment.

- **Developing interim uses that do not require the construction of buildings.** Opportunities to develop surface parking lots, garden centers, dog parks, impermanent farmer's market stalls, or other uses which do not require the construction of a structure will make the development of a permanent use more easy and affordable.
- **Limiting development with negative environmental impacts.** The County should limit or discourage the development of uses that could create negative environmental impacts, such as gas stations, dry cleaners, and other uses which might require site remediation to redevelop the land. Remediation efforts would increase the cost to redevelop and decrease the likelihood of future redevelopment of a permanent use.

In addition, the HR&A Team recommends establishing sunset periods for interim uses. The County should establish sunset periods for each interim use. The County should include provisions for renewal of an interim use based on evidence of a lack of market feasibility for uses consistent with Plan Policy and demonstrated market support for continued performance of the interim use.

Key findings supporting the HR&A Team's recommendations include:

- **Without a strong office market, developers at Metrorail Stations in the region are developing interim uses at Station Areas until the office market improves.** JBG Co's Reston Town Center West received approval from the Fairfax County Board of Supervisors to convert 15,100 square feet of older office buildings into retail and the construction of 25,000 square feet of new retail and restaurant space near the forthcoming Reston Metrorail Station.¹⁸ JBG has positioned this development as an interim use until the regional market will support additional uses which may become more evident after the arrival of the Silver Line at Reston.
- **Proactively planning for the development of interim uses could prevent stalled development due to changes in market conditions.** Developing flexible land use policy and zoning allows developers to respond to changes in market conditions and install interim uses that generate revenues for the owner and local government that would be higher than if the property were left vacant. Without flexible responses to economic conditions land can remain undeveloped, creating a financial burden on local landowners and reducing the economic value for local municipalities.

Plan Policy & Zoning Implications

"Interim use" is not currently defined in County Plan Policy or the Zoning Ordinance, but can be achieved through a proffer or Condition of Approval in a Special Exception application. The HR&A Team identified a number of potential interim uses for the Station Areas and reviewed their development potential in light of the County's Plan Policy and Zoning. These uses include a surface parking lot, low intensity retail, big box retail, flex space, and a sport and recreation facility. The list of uses allowed by special exception permits would need to be modified to include all of these uses and any others that the County deems to be appropriate based on their ability to generate jobs, tax revenues, and be redeveloped into a higher density permanent use in the future.

¹⁸ Goff, Karen. "RTC West: A Project Primer for the Future." *Reston.Now* Apr. 2, 2015.

One of the most important implications for Plan Policy that cuts across interim uses is the development of a policy to require special exception permits for interim uses to include sunset clauses. The clause would terminate the permit after a set number of years or based on market conditions. This approach would help prevent the permanent establishment of a use that is inconsistent with plan policy and long-term development goals for the Station Areas.

Developers should be required to provide an independent feasibility analysis to show market support for the use, and an assessment of development impacts on the County, including fiscal, economic, and traffic impacts. If the net impacts are negative, the Developer and the County should work together to develop a mitigation strategy if the use is still deemed an appropriate short-term use.

Figure 4-6: Plan Policy Implications for Potential Interim Uses at the Station Areas

| Interim Use | Plan Policy Implications by Interim Use |
|----------------------|--|
| Surface Parking | <p>Current Plan Policy</p> <ul style="list-style-type: none"> • Current TREC Plan Policy limits surface parking to support the development of high-intensity employment uses and/or a Special Activity use. • TOD Plan Policy recommends the development of a parking deck to support parking needs at the Ashburn Station Area but does not discuss the development of surface parking lots. • TREC and TOD Plan Policy do not discuss the development of interim uses at the Station Areas. <p>Plan Policy Recommendations</p> <ul style="list-style-type: none"> • The HR&A Team recommends revisions to TOD and TREC Plan Policies to allow development of commuter parking as an interim use at the Station Areas. • As an interim use, a surface commuter parking lot would be more feasible at the Loudoun Gateway Station which has yet to receive the same level of development as the Ashburn Station. Development of a commuter parking lot at Loudoun Gateway is less likely to preclude other development than at the Ashburn Station. |
| Low Intensity Retail | <p>Current Plan Policy</p> <ul style="list-style-type: none"> • TREC Plan Policy allows for the development of support retail as a component of planned development at the Loudoun Gateway Station. • TOD Plan Policy allows the development of convenience and ground floor retail at the Ashburn Station. |

| Interim Use | Plan Policy Implications by Interim Use |
|-------------------------------|---|
| | <p>Plan Policy Recommendations</p> <ul style="list-style-type: none"> The HR&A Team recommends Plan Policy be revised to allow stand-alone low-intensity retail and as an interim use. |
| Big Box Retail | <p>Current Plan Policy</p> <ul style="list-style-type: none"> TREC and TOD Plan Policy do not envision large format retail as interim uses at the Station Areas. <p>Plan Policy Recommendations</p> <ul style="list-style-type: none"> While Big Box retail is generally compatible with airport-adjacent development, developers wishing to propose Big Box retail at the Loudoun Gateway Station should be required to provide a detailed feasibility analysis which supports its development and provides an overview of the fiscal and traffic impacts. If fiscal and traffic impacts are shown to be negative, the developer must provide strategies to mitigate negative impacts. The HR&A Team recommends a revision to Plan Policy to allow Big-Box retail at the Loudoun Gateway Station as an interim use if developers can show the positive economic impact of development and mitigate any negative impacts of the use. |
| Flex Space | <p>Current Plan Policy</p> <ul style="list-style-type: none"> TREC Plan Policy allows for the development of light industrial development at the Loudoun Gateway Station. TOD Plan Policy does not envision development of light industrial or flex uses. TOD emphasizes high-density, mixed-use development. <p>Plan Policy Recommendations</p> <ul style="list-style-type: none"> No Changes to TREC policy are recommended as flex space is currently permitted around the Loudoun Gateway Station. The HR&A Team does not recommend a change to TOD Plan Policy to allow the development of flex space at the Ashburn Station. |
| Sport and Recreation Facility | <p>Current Plan Policy</p> <ul style="list-style-type: none"> TREC and TOD Plan Policy do not specifically discuss the development of sports and recreation facilities at the Loudoun Gateway Station but these uses are considered special activity uses that are considered. |

| Interim Use | Plan Policy Implications by Interim Use |
|-------------|---|
| | Plan Policy Recommendations <ul style="list-style-type: none"> The HR&A Team recommends that Plan Policy set standards allowing the development of sports and recreation facilities at the Station Areas. |

The HR&A Team evaluated the County's Zoning Ordinance to identify potential revisions required to support specific interim uses. A discussion of the current Zoning and recommended changes can be found in the following table:

Figure 4-7: Zoning Implications for Potential Interim Uses at the Station Areas

| Interim Use | County Zoning Implications by Interim Use |
|-----------------|---|
| Surface Parking | Current Zoning Standards <ul style="list-style-type: none"> Under PD-TREC and PD-TRC zoning categories, commuter parking facilities are allowed by special exception in the Inner and Outer Core. An off-street, freestanding parking facility which serves two or more lots in the form of above or below-ground parking structure is allowed in the Inner and Other Core of the Ashburn Station Area under PD-TRC zoning. An off-street, freestanding surface parking lot is allowed in the Outer Core of the Loudoun Gateway Station Area pending approval from a Special Exception. Freestanding parking facilities in the form of an above or below-ground parking structure are allowed under PD-TREC zoning category in the Inner and Outer Core at the Loudoun Gateway Station. Recommended Changes to County Zoning <ul style="list-style-type: none"> The HR&A Team has no recommended changes to the County's Zoning Ordinance. |

| Interim Use | County Zoning Implications by Interim Use |
|----------------------|---|
| Low Intensity Retail | <p>Current Zoning Standards</p> <ul style="list-style-type: none"> Low intensity retail, such as restaurants and retail are permitted in the Inner and Outer Core under the PD-TREC zoning category at the Loudoun Gateway Station with the following conditions: <ul style="list-style-type: none"> Retail establishments must be under 15,000 SF. Permitted restaurant typologies include dine in, carryout, and fast food. Drive through facilities for retail and restaurant uses are prohibited. Low intensity retail at the Ashburn Station is approved in the Inner and Outer Core under the PD-TRC zoning category with the following conditions: <ul style="list-style-type: none"> Retail establishments must be under 10,000 SF. Food Stores and Convenience Food Stores are permitted uses. Restaurants including dine-in, carry out, and fast-food without drive-through facilities are a permitted uses. <p>Recommended Changes to County Zoning</p> <ul style="list-style-type: none"> The HR&A Team has no recommended revisions to the County's Zoning Ordinance. |
| Big Box Retail | <p>Current Zoning Standards</p> <ul style="list-style-type: none"> Under the PD-TREC zoning category at the Loudoun Gateway Station, Big Box retail is not a permitted use since all freestanding, single-story retail structures must be 15,000 SF of GLA or less. PD-TRC zoning at the Ashburn Station precludes big box retail since all retail establishments must be under 10,000 SF. <p>Recommended Changes to County Zoning</p> <ul style="list-style-type: none"> The HR&A Team recommends a revision to PD-TREC Zoning to allow Big Box retail at the Loudoun Gateway Station as an interim use if developers can show the positive economic impact of development and mitigate any negative impacts of the use. For the Ashburn Station Area, the HR&A Team does not recommend changing PD-TRC Zoning with respect to Big Box retail uses. |
| Flex Space | <p>Current Zoning Standards</p> <ul style="list-style-type: none"> Flex industrial and light manufacturing uses are permitted by special exception in the Outer Core under PD-TREC Zoning at the Loudoun Gateway Station with the following restrictions: |

| Interim Use | County Zoning Implications by Interim Use |
|--------------------------------|--|
| | <ul style="list-style-type: none"> ○ Flex industrial must not exceed two stories in height, contain a minimum of two loading bays which are screened from the street, have less than 49% of the gross floor area for non-accessory office uses, exclude outdoor storage, and adhere to the zoning ordinance for the emission of noise and/or vibrations. ○ Light industrial may not generate noise, odor, vibration, or other hazard outside of the property boundaries in accordance with zoning ordinance, and manufacturing is limited to a set of products outlined in PD-TREC zoning category. <ul style="list-style-type: none"> ● Flex industrial and light manufacturing uses are not allowed under PD-TRC Zoning at the Ashburn Station Area. <p>Recommended Changes to County Zoning</p> <ul style="list-style-type: none"> ● The HR&A Team does not recommend any changes to the PD-TRC Zoning. ● The HR&A Team recommends a revision to PD-TREC Zoning to allow flex space at the Loudoun Gateway Station as an interim use if developers can show the positive economic impact of development and mitigate any negative impacts of the use. |
| Sports and Recreation Facility | <p>Current Zoning Standards</p> <ul style="list-style-type: none"> ● Recreation facilities in the form of parks and playgrounds are permitted under PD-TREC and PD-TRC zoning in the Inner and Outer Core of the Loudoun Gateway Station and Ashburn Stations. ● Under PD-TREC zoning at Loudoun Gateway Station and PD-TRC zoning at the Ashburn Station, an indoor recreation facility is permitted in the Inner and Outer Core if the facility is a building which is a minimum of three stories in height, has two or more distinct principal uses that do not share the same physical space, and is not more than 10,000 SF. <p>Recommended Changes to County Zoning</p> <ul style="list-style-type: none"> ● The HR&A Team recommends a revision to PD-TREC Zoning to allow privately-operated sports and recreation facilities at the Loudoun Gateway Station as an interim use if developers can show the positive economic impact of development and mitigate any negative impacts of the use. ● The HR&A Team does not recommend any changes to PD-TRC with respect to sports and recreation facilities. |

Impact on Job Generation

The development of interim uses at the Station Areas will likely create jobs in Loudoun County. The number of new jobs will vary by the type of interim use, but would be similar to the rate of jobs created by similar permanent uses within buildings. However, it is likely that interim uses would be developed in a less land-intensive format compared with denser transit-oriented development, and as such the number of jobs per acre of land would likely be lower with interim uses compared with the type of permanent development that is more consistent with the County's Plan Policy.

Impact on and Tax Revenues

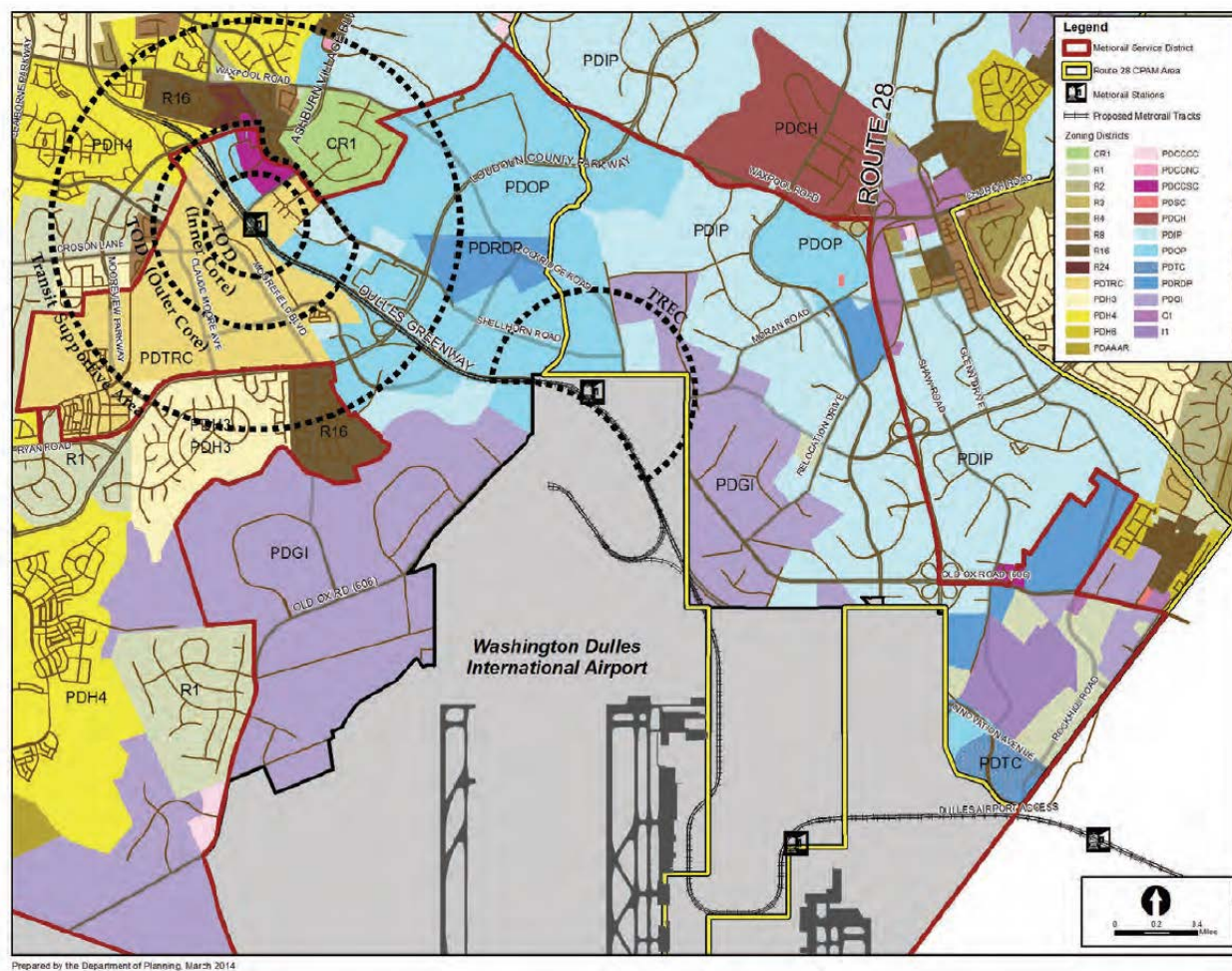
The development of interim uses at the Station Areas by the private sector will generate tax revenues for the County. While the taxable value of an interim use will be lower than a permanent use because, by design buildings will be constructed with lower cost materials in anticipation of being temporary, it will be greater than vacant land. For interim uses that do not conform to current Plan Policy and Zoning, the HR&A Team recommends that applicants be required to analyze the market support and fiscal impacts of the project, for consideration by the County prior to approval. This process will help ensure that there is a sufficient market for the use and the returns to the County exceed any fiscal service costs.

Appendix

| | |
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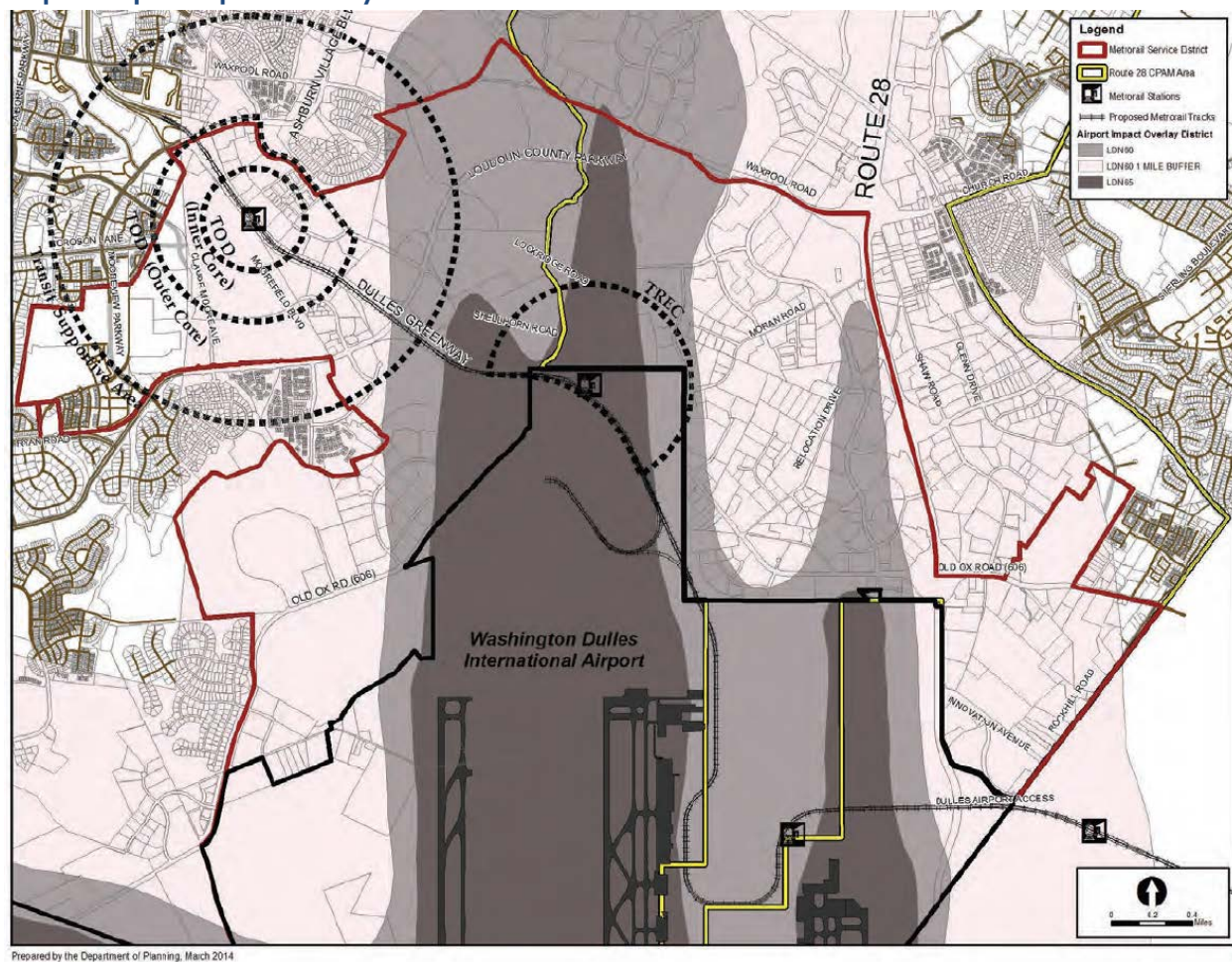
ATTACHMENT 1

Map 1: Study Area Zoning Districts



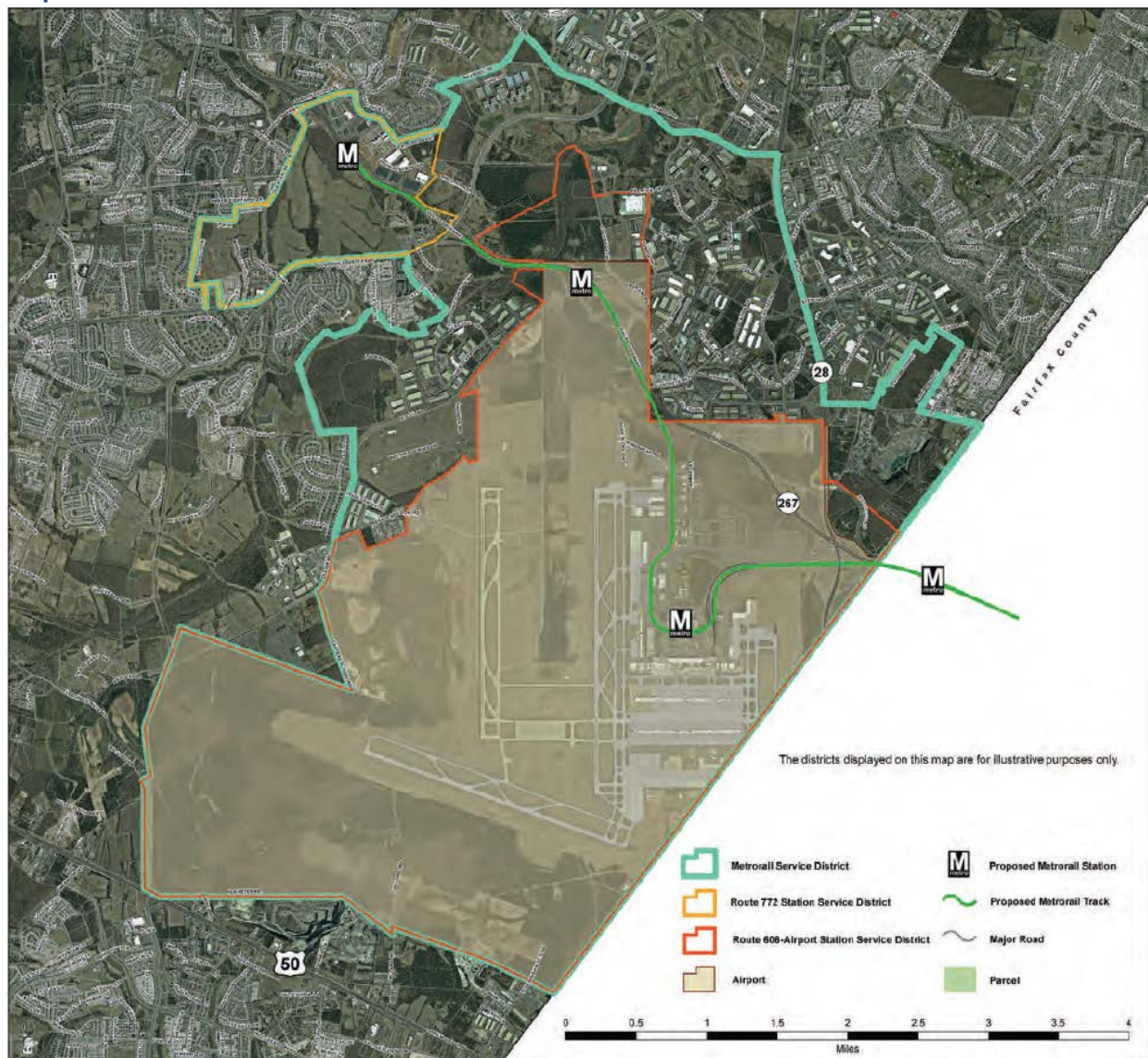
Source: Loudoun County Government Department of Planning & Zoning, "Study Area Zoning Districts"

Map 2: Airport Impact Overlay District



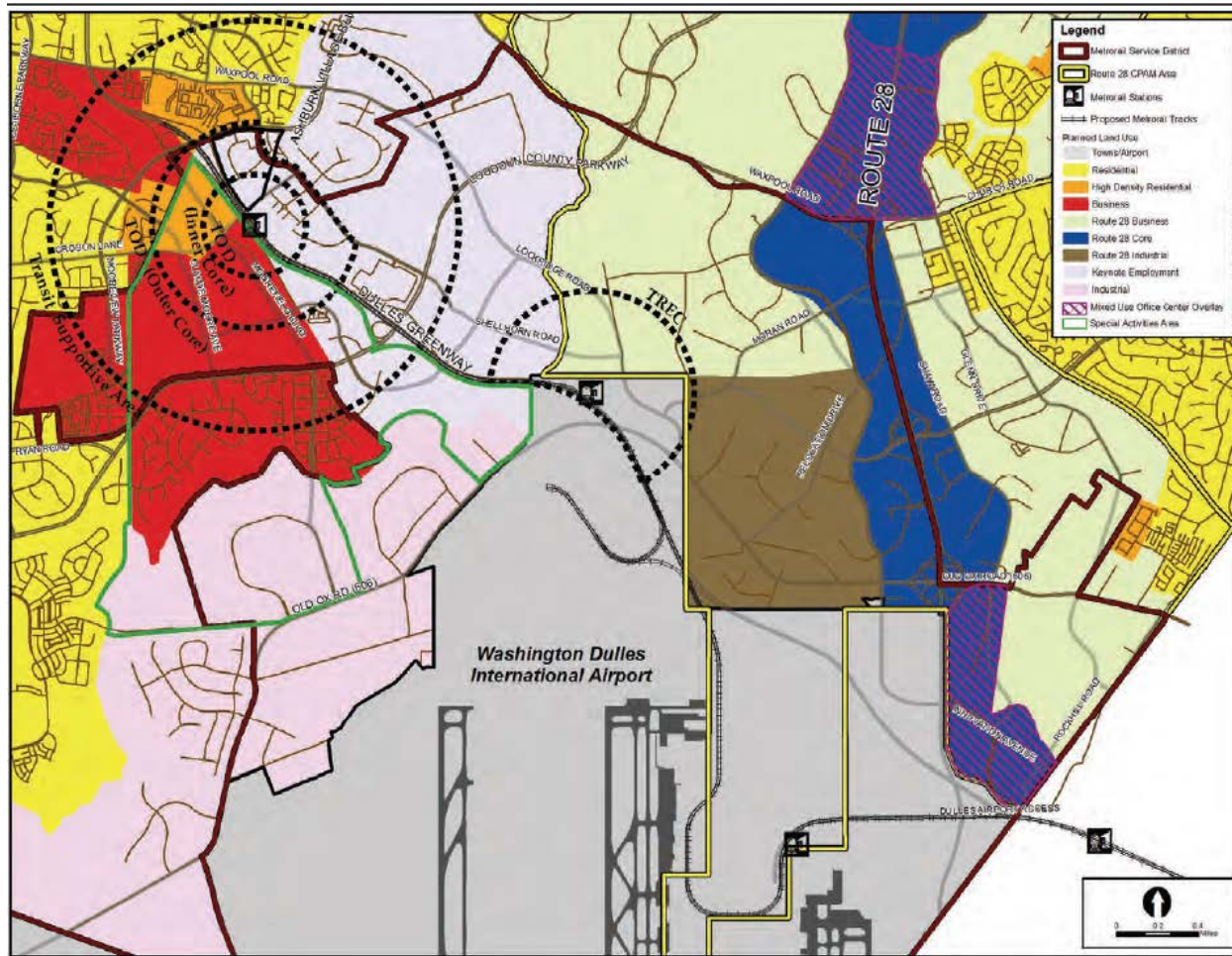
Source: Loudoun County Government Department of Planning & Zoning, "Airport Impact Overlay District"

Map 3: Service Districts



Source: Loudoun County Government Department of Planning & Zoning, "Metrorail Service District"

Map 4: Study Area Planned Land Use



Source: Loudoun County Government Department of Planning & Zoning, "Study Area Planned Land Use"

ATTACHMENT 2

A1: Airport Adjacent Development Patterns, USA Airports

| Airport | Airport Code | Exurban | Hotels & Convention Center | Retail HUB | Theme Parks/ Entertainment | Adjacent Residential | Office | Rail/Transit Access | Transit Oriented Developments | Logistics Clusters | Health Related Clusters | Enterprise Zones - Special Economic Zones | Additional Comments |
|---------------------------------|--------------|---------|----------------------------|------------|----------------------------|----------------------|--------|---------------------|-------------------------------|--------------------|-------------------------|---|--|
| Washington Dulles International | IAD | Yes | | | | | | | | | | | No direct connection to transit. Coming in the near future |
| Washington Reagan | DCA | No | | | | | | | | | | | Direct connection to Metrorail System, very limited developable lands, river provides good noise buffer zone. Within an urban environment |
| Baltimore Washington | BWI | Yes | | | | | | | | | | | Direct and close connection to major intra-city rail system. Limited transit access |
| Dallas Fort Worth | DFW | Yes | | | | | | | | | | | One of the first Airports in the US to embrace the concept of Airport City. Also has Noise Compatibility Program |
| Atlanta Hartsfield | ATL | Yes | | | | | | | | | | | Noise insulation program (residential); noise land reuse plan, good connection to Metrorail system. Just recently started plan to fully embrace and develop the airport city concept |
| Denver International | DIA | Yes | | | | | | | | | | | Very new effort to develop the airport city concept. Building a major rail and multi-transportation center |
| Los Angeles | LAX | Yes | | | | | | | | | | | Noise abatement program attempts to keep aircraft over the ocean, rather than residences, when flying at night |
| Minneapolis - St Paul | MSP | Yes | | | | | | | | | | | Protected departure corridors, nighttime operations control agreements; Residential Noise Mitigation program. Mall of America built as an attraction. |

| | | | | | | | | | | | |
|-------------------------|--|--------------------------------|--|---------------------------|--|-----------------------------|--|----------------|--|--------------------|--|
| High Development Levels | | Medium High Development Levels | | Medium Development Levels | | Moderate Development Levels | | No Development | | Future Development | |
|-------------------------|--|--------------------------------|--|---------------------------|--|-----------------------------|--|----------------|--|--------------------|--|

Section 5: Appendix

A1 (cont.): Airport Adjacent Development Patterns, USA Airports

| Airport | Airport Code | Exurban | Hotels & Convention Center | Retail HUB | Theme Parks/ Entertainment | Adjacent Residential | Office | Rail/Transit Access | Transit Oriented Developments | Logistics Clusters | Health Related Clusters | Enterprise Zones - Special Economic Zones | Additional Comments |
|-------------------------|--------------|---------|----------------------------|------------|----------------------------|----------------------|--------|---------------------|-------------------------------|--------------------|-------------------------|---|---|
| Amsterdam Schiphol | AMS | Yes | | | | | | | | | | | Good access to rail and transit, various residential areas. Noise mitigation and charging system, Several residential areas have been insulated |
| London Heathrow | LHR | Yes | | | | | | | | | | | Plans to insulate all homes within a 55 decibel contour level if their third runway proposal is approved. (acoustic double glazing in windows, ceiling over boarding in bedrooms, loft insulation and ventilation) – up to 160,000 homes. Also the airport is buying 750 homes at 25% above market price. |
| Paris Charles De Gaulle | CDG | Yes | | | | | | | | | | | The airport is well connected to transit but development around it seems to not have taken advantage of the airport business and its economic engine capabilities. High density residential development have been located in close proximity and some along flight paths |
| Tokyo Haneda | HND | No | | | | | | | | | | | Airport was built and expanded on a man-made island on the bay to avoid noise to residents. High density offices and commerce nearby, excellent access to transit, old high density residential, little land for new development, high industrial/port type developments |
| Frankfurt | FRA | Yes | | | | | | | | | | | Dedicated runway operations; increased angle of approach; noise-related airport charges; Casa program - Airport purchases residential property through the Casa Program where planes fly particularly low – at an altitude of less than 350 m – or it pays the owners compensation |
| Singapore | SIN | Yes | | | | | | | | | | | Three of four runways lead to the sea - only one directs planes over land. Well organized and planned development around the airport. Airport has developed as a destination on its own becoming a major connecting HUB and providing a range of amenities to connecting and transient passengers |
| Kuala Lumpur | KUL | Yes | | | | | | | | | | | Plenty of land for development, has taken the approach in addition to having the airport become a center of economic development also including developments to make the airport in itself a destination through major retail developments. |

| | | | | | | | | | | | |
|-------------------------|--|--------------------------------|--|---------------------------|--|-----------------------------|--|----------------|--|--------------------|--|
| High Development Levels | | Medium High Development Levels | | Medium Development Levels | | Moderate Development Levels | | No Development | | Future Development | |
|-------------------------|--|--------------------------------|--|---------------------------|--|-----------------------------|--|----------------|--|--------------------|--|

A2: Relative Development Level by Land Use at Global Airports.

| Airport | Airport Code | Exurban | Rail/Transit Access | Transit Oriented Developments | Hotels | Convention /Exhibition/ Training Center | Retail HUB | Entertainment | Adjacent Residential | Office | Logistics Clusters | Health Related Clusters | Enterprise Zones |
|--|--------------|------------|---------------------|-------------------------------|----------|---|------------|---------------|----------------------|-----------|--------------------|-------------------------|------------------|
| Washington Dulles International | IAD | Yes | 2 | 0 | 4 | 6 | 2 | 2 | 2 | 6 | 4 | 0 | 0 |
| Washington Reagan | DCA | No | 10 | 10 | 8 | 8 | 8 | 8 | 10 | 10 | 0 | 0 | 0 |
| Baltimore Washington | BWI | Yes | 4 | 0 | 6 | 8 | 2 | 2 | 6 | 6 | 4 | 0 | 8 |
| Dallas Fort Worth | DFW | Yes | 6 | 4 | 6 | 6 | 2 | 2 | 2 | 8 | 4 | 0 | 8 |
| Atlanta Hartsfield | ATL | Yes | 8 | 4 | 6 | 8 | 2 | 2 | 6 | 8 | 4 | 0 | 0 |
| Denver International | DIA | Yes | 2 | | 2 | | | | 0 | 2 | | 0 | |
| Los Angeles | LAX | Yes | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 8 | 4 | 0 | 0 |
| Minneapolis - St Paul | MSP | Yes | 6 | 4 | 6 | 2 | 2 | 8 | 4 | 6 | 2 | 0 | 0 |
| Amsterdam Schiphol | AMS | Yes | 8 | 6 | 8 | 2 | 8 | 4 | 8 | 8 | 8 | 0 | 0 |
| London Heathrow | LHR | Yes | 6 | 6 | 8 | 6 | 8 | 4 | 8 | 8 | 4 | 0 | 0 |
| Paris Charles De Gaulle | CDG | Yes | 6 | 6 | 8 | 10 | 2 | 2 | 6 | 6 | 4 | 0 | 0 |
| Tokyo Haneda | HND | No | 10 | 10 | 8 | 8 | 8 | 8 | 10 | 10 | 2 | 0 | 0 |
| Frankfurt | FRA | Yes | 6 | 6 | 8 | 10 | 4 | 2 | 8 | 10 | 8 | 0 | 8 |
| Singapore | SIN | Yes | 4 | 2 | 8 | 4 | 8 | 8 | 0 | 10 | 8 | 6 | 8 |
| Kuala Lumpur | KUL | Yes | 4 | | 6 | | 8 | 6 | 0 | 6 | 4 | | 8 |

Existence or Development Levels:



B1: Development Patterns ½ Mile from Competitive Station Nodes on the Silver Line

| | Tysons Corner Metrorail Station | Reston Town Center Metrorail Station | Innovation Center Metrorail Station | Ashburn | Loudoun Gateway |
|----------------------------|--|---|--|----------------|----------------------------|
| Metrorail Opening | 2014 | 2018 | 2018 | 2019 | 2019 |
| Office | | | | | |
| Square Footage | 8.8 million | 1.3 million | 1.6 million | 169,000 | N/A |
| Vacancy Rate | 20.90% | 19.30% | 22.80% | 46.60% | N/A |
| Vacancy Trends | upward | upward | upward | upwards | N/A |
| Office Rent | \$33.20 | \$32.36 | \$26.97 | \$27.37 | N/A |
| Rent Trends | downward | upward | downward | upwards | N/A |
| Office Pipeline (SF) | 2 million | 580,000 | 1.3 million | 600,000 | N/A |
| Retail | | | | | |
| Square Footage | 3.8 million | 344,617 | 0 | 419,000 | N/A |
| Vacancy Rate | 0.60% | 0.90% | N/A | 7.90% | N/A |
| Vacancy Trends | downward | stable | N/A | downward | N/A |
| Retail Rent | \$46.60 | N/A | N/A | \$36.81 | N/A |
| Rent Trends | stable | N/A | N/A | stable | N/A |
| Retail Pipeline (SF) | 0 | 50,100 | 200,000 | 5,300 | N/A |
| Multifamily | | | | | |
| Number of Units | 729 | 1,934 | 2,086 | 651 | N/A |
| Vacancy Rate | N/A | 5.40% | 7.10% | 1.10% | N/A |
| Vacancy Trends | N/A | downward | upward | stable | N/A |
| Multifamily Rent (Average) | \$1,975 | \$2,042 | \$1,560 | \$1,550 | N/A |
| Rent Trends | stable | downward | upward | upwards | N/A |
| Multifamily Pipeline (SF) | 2.6 million SF | 457 units | 3572 units | 900 units | N/A |

Source: CoStar Office, Retail, and Multi-Family Property Analytics

B2: Overview of Real Estate Conditions and Development Pipeline along the Silver Line

Tysons Corner Metrorail Station:

Tysons Corner Metrorail Station is located between two major regional shopping malls, Tysons Corner Center and Tysons Galleria, along Chain Bridge Road. Tysons Corner transformed from open fields in the 1960s to its current status as the largest office market in Virginia and one of the leading business centers in the nation¹, as the result of 32.4 M square feet of office and retail development to support a range of companies²; from startups to Fortune 500 companies such as Boeing, IBM, and PriceWaterhouseCoopers. The introduction of Metrorail access has been harnessed as an opportunity to redevelop Tysons Corner as a more mixed-use destination. Fairfax County led a very detailed master plan process which coordinated design guidelines, public realm investments, and land use to promote an urban form which is highly walkable, urban and dense. Land within a half-mile of the Tysons Corner Metrorail Station is owned by several large entities, including Tysons Corner Property Holdings (Tysons Corner Mall), the Saul Company, TRC Pinnacle Towers LLC, along with smaller parcels owned by different private companies and entities, including Chevy Chase Bank and Sunoco. ³ Around the Tysons Corner Metrorail Station there is 8.8 million square feet of office, 3.8 million square feet of retail, and 729 multi-family units.

- **Retail Pipeline and Development:** Within a half mile of the Tysons Corner Metrorail Station there is no planned development of retail uses.
- **Residential Pipeline and Development:** The residential pipeline within a half-mile of the Tysons Corner Metrorail Station has 2.6 million square feet of planned multi-family development, all of which will have started construction by 2018.⁴ Recent multi-family development includes VITA, a 429 luxury apartment building developed by KETTLER, with luxury interior finishes, and high end amenities such as a rooftop pool and 24 hour concierge services. Rental rates for a one bedroom at VITA start at \$1,985/month for 542 square feet⁵, or roughly \$3.66/square foot. This rent is comparable to a one bedroom in new luxury buildings in established residential neighborhoods. For instance, The Beacon in Clarendon is a new luxury apartment building two blocks from the Clarendon Metrorail Station and one bedroom unit of 663 square feet has a starting rent of \$2,202, or roughly \$3.32 square foot. ⁶ The comparable market rents in Tysons Corner, to more established and popular residential neighborhoods indicate developers believe Tysons Corner will become a competitive residential destination.
- **Office Pipeline and Development:** Pipeline development within a half-mile of the Tysons Corner Metrorail Station includes 2 million square feet of office space.⁷ While demonstrating a robust office pipeline, none of the proposed office developments have a construction start date, whereas all 2.6 million square feet of residential is slated to have begun construction by 2018. This indicates that office developers are uncertain about the recovery period of the office market and are not pushing the development of new office space to market.
- **Development Conclusion:** The concentrated development of residential over office uses at Tysons Corner speaks both to the strong residential market in the region, and the submarket's transformation from an office area, into a mixed-use urban community.

¹ Fairfax County Economic Development Authority, "Tysons Corner Business Area." Accessed June 23, 2015.

² Fairfax County Economic Development Authority, "Tysons Corner Business Area." Accessed June 23, 2015.

³ Fairfax County, Department of Tax Administration's Real Estate Assessment Database.

⁴ CoStar Market Analytics, Office, and Multi-Family Overview.

⁵ VITA, Tysons Corner Center, "Our Floor Plans" Accessed on June, 23, 2015.

⁶ The Beacon Clarendon Apartments, "Floorplans." Accessed on June 23, 2015.

⁷ CoStar Market Analytics, Office, and Multi-Family Overview.

Reston Town Center Metrorail Station:

Reston Town Center Metrorail Station is located south of one of the original mixed-use, urban, live/work destinations, Reston Town Center. The future Metrorail stop is sited in the median of the Dulles Toll Road, west of the Dulles Parkway and 2,000 feet south of the iconic Town Center. Initial development for the Reston Town Center began in the 1950s going through several owners before Robert E. Simon took over in 1961 and developed a high density plan for Reston, providing roads, infrastructure, and public amenities such as schools and libraries for residents. The 1990s saw the development of a high-density core with office, hotel, professional space and the central fountain and public space for events. Through the successful creation of a unique sense of place, with a balance of office, residential, entertainment, and retail, Reston Town Center has become one of the region's strongest real estate markets and maintained high occupancy across all products during the Great Recession. Within a half-mile of the proposed Reston Town Center Metrorail Station there is 1.3 million square feet of office, 345,000 square feet of retail, and 1,934 multi-family units.⁸

- **Retail Pipeline and Development:** The development pipeline around the Metrorail Station includes 50,100 square feet of retail and is concentrated in the Reston Town Center West site, owned by JBG, who is renovating office buildings to create a vibrant ground floor retail and pedestrian experience for users as they move between the proposed metrorail stop and Reston Town Center. Redevelopment plans for the site call constitute 40,100 square feet of the total retail pipeline at Reston Town Center Metrorail.⁹
- **Residential Pipeline and Development:** Plans for residential development at the Reston Town Center Metrorail Station include 457 multi-family units in a former suburban office park. The developer may be repositioning their property to take advantage of a strong residential market and potential increased residential demand with the upcoming arrival of Metrorail.
- **Office Pipeline and Development:** An office pipeline for the Reston Town Center Metrorail Station includes 580,000 square feet of proposed office across two office buildings within an office park. As the pipeline for development does not include potential construction dates, it is unlikely these buildings will be constructed without improvements to the regional office market.
- **Development Conclusion:** Proximity to Reston Town Center provides a strong anchor for development around the Reston Town Center Metrorail Station; new retail development appears to be positioning itself to leverage the existing activity at Reston Town Center to ensure long-term success.

Innovation Center Metrorail Station:

Innovation Center Metrorail Station is a planned transit-oriented development to create a complete live/work/play destination as outlined in Fairfax County's, "Strategic Plan to Facilitate the Economic Success of Fairfax County." Adjacent to the Center for Innovative Technology, a regional tech incubator which provides funding to stimulate research in technology, accelerate the commercialization process and assist in the creation of new companies, development plans at the station include high-rise research, office, residential, hotel and retail uses. Aside from the Center for Innovative Technology, the area remains relatively unbuilt with 1.6 million square feet of office (includes CIT), no retail development, and 2,086 units of multi-family development. Development plans for the site consist of Innovation Center South, which includes 501,200 square feet of office, 104,000 square feet of retail, over 1,000 multi-family units, a

⁸ CoStar Market Analytics, Retail, Office, and Multi-Family Overview.

⁹ Goff, Karen. "JBG Plans New Retail, Dining Destination Close to Metro" Reston.now Jan 26, 2015.

109 key hotel of 90,000 square feet, and over 2.5 acres of parks.¹⁰ To begin initial site infrastructure, Fairfax County has partnered with Rock Engineering Company and Nugget Joint Venture to consolidate land holdings to facilitate the development of a Metrorail parking garage at the station, and entered into an agreement to share the cost of site infrastructure including, roads, lighting, and parks.¹¹ Developer Nugget Joint Venture expects the full build-out of its proposed, Innovation Center South, to be completed in 2020, two-years after Metrorail arrives at the station.¹²

- **Retail Pipeline and Development:** The retail pipeline around the Innovation Center Metrorail Station includes the 104,000 square feet of retail as part of Innovation Center South, along with a potential 200,000 square feet of retail as part of Dulles World Center, which is adjacent to the proposed Metrorail stop and within Loudoun County. In 2014 Loudoun County approved the development of residential units to jumpstart the larger 4 million square foot project.¹³
- **Residential Pipeline and Development:** Between Dulles World Center and the planned Innovation Center South over 3,236 multi-family units are planned within a half-mile of the Innovation Center Metrorail Station.
- **Office Pipeline and Development:** Up to 3.7 million square feet of office is proposed between Dulles World Center, Innovation Center, and smaller office developments such as Dulles Station West and Dulles Station East. However, planned office development at Dulles World Center has been postponed until a recovery in the general office market occurs,¹⁴ and it's likely that other planned office in the Innovation Center Metrorail Station will follow a similar development schedule.
- **Development Conclusion:** development at the Innovation Center Metrorail Station will have an additional challenge of creating a unique development identity at a location with a low regional profile, especially compared to Tysons Corner and Reston Town Center. While development at Innovation Center can leverage a connection to the Center for Innovative Technology, residential and retail uses can create a new station brand and image to market the location. Loudoun Gateway will have a similar opportunity to develop an entirely new station identity and actions taken at Innovation Center Metrorail may provide a future roadmap for branding and placemaking.

¹⁰ Neibauer, Michael. "Golden nugget? Innovation Center Metro station takes shape with proposed 1.7M-square-foot project." Washington Business Journal, May 2, 2014.

¹¹ Fairfax County. "Fairfax Inks a Deal to Build the Silver Line's Innovation Station Garage." July 29, 2014.

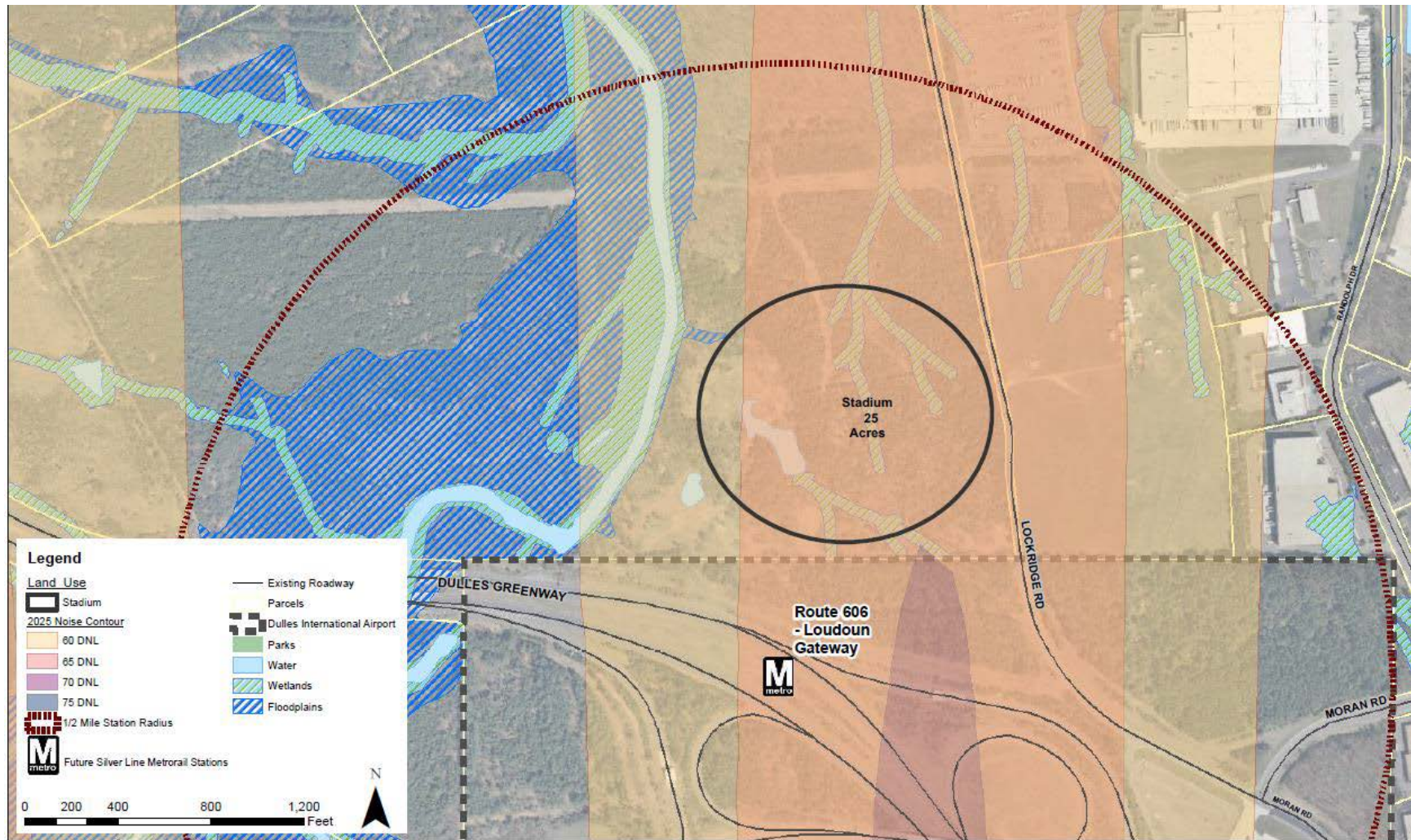
¹² Neibauer, Michael. "Golden nugget? Innovation Center Metro station takes shape with proposed 1.7M-square-foot project." Washington Business Journal, May 2, 2014.

¹³ Neibauer, Michael. "Loudoun Oks residential first at Dulles World Center to kick start massive project." Washington Business Journal. Jan 17, 2014.

¹⁴ Neibauer, Michael. "Loudoun Oks residential first at Dulles World Center to kick start massive project." Washington Business Journal. Jan 17, 2014.

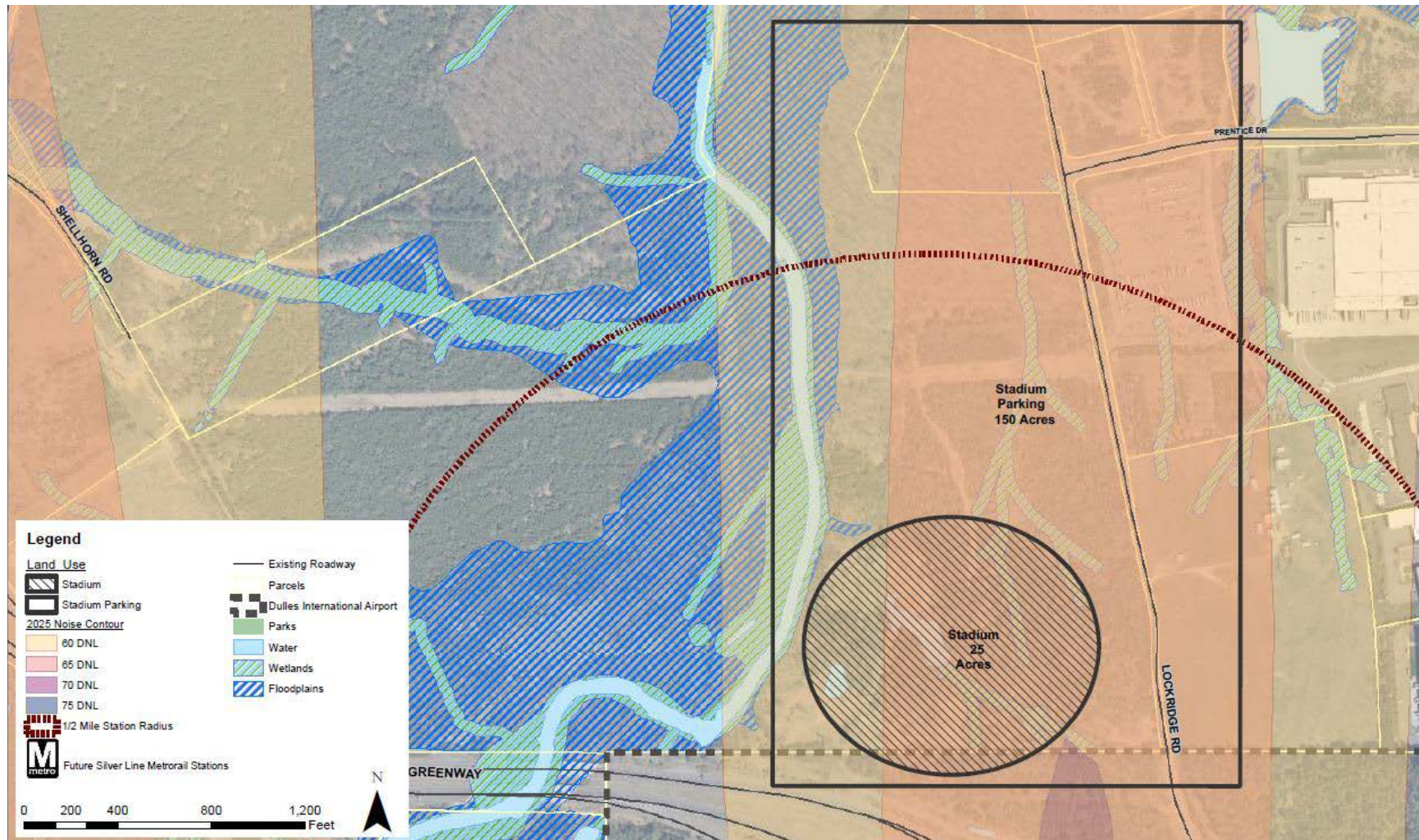
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C1: Potential Stadium Siting at Loudoun Gateway Station (No Parking)



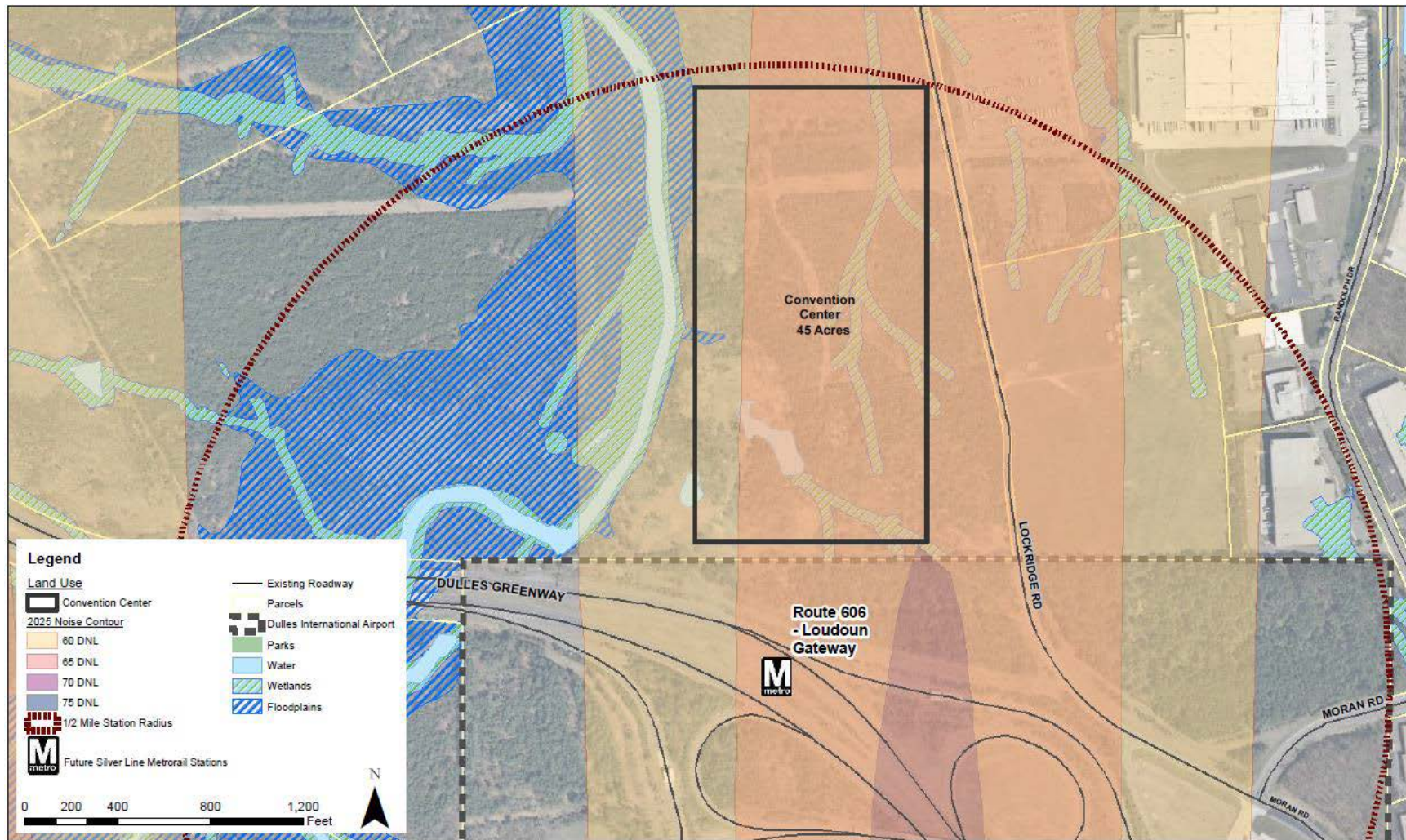
Source: Kimley-Horn

C2: Potential Stadium Siting at Loudoun Gateway Station (With Parking)



Source: Kimley-Horn

C3: Potential Convention Center Siting at Loudoun Gateway Station (With Parking & Hotel)



Source: Kimley-Horn

D: Loudoun County Office Deliveries, 2006-2015

Source: CoStar Office Market Property Analytics

| 2006 Office Deliveries | | |
|--|---------------------|-------------------------------|
| Class A Office Deliveries | City | Rentable Building Area |
| Janelia Farm Blvd | Ashburn | 750,000 |
| 19465 Deerfield Ave | Lansdowne | 98,845 |
| 19455 Deerfield Ave | Lansdowne | 75,410 |
| 19980 Highland Vista Dr | Ashburn | 64,287 |
| 43480 Yukon Dr | Ashburn | 60,000 |
| 20110 Ashbrook Pl | Ashburn | 58,000 |
| <u>44121 Harry Byrd Hwy</u> | <u>Ashburn</u> | <u>57,649</u> |
| Total Class A Office Deliveries | | 1,164,191 |
| Class B Office Deliveries | City | Rentable Building Area |
| 44075 Pipeline Plz | Ashburn | 162,000 |
| 44081 Pipeline Plz | Ashburn | 85,000 |
| 46090 Lake Center Plz | Potomac Falls | 51,634 |
| 44927 George Washington Blvd | Ashburn | 35,500 |
| 19420 Golf Vista Plz | Lansdowne | 31,417 |
| 19440 Golf Vista Plz | Lansdowne | 31,417 |
| 19441 Golf Vista Plz | Lansdowne | 31,417 |
| 20937 Ashburn Rd | Ashburn | 30,000 |
| 45195 Research Pl | Ashburn | 24,352 |
| 45189 Research Pl | Ashburn | 18,600 |
| 165 Fort Evans Rd NE | Leesburg | 18,538 |
| 45201 Research Pl | Ashburn | 17,691 |
| 45207 Research Pl | Ashburn | 16,400 |
| 44330 Premier Plaza | Ashburn | 16,321 |
| 44340 Premier Plaza | Ashburn | 16,321 |
| 44031 Pipeline Plz | Ashburn | 15,276 |
| 44025 Pipeline Plz | Ashburn | 14,904 |
| 44320 Premier Plaza | Ashburn | 14,000 |
| 307 E Market St | Leesburg | 8,000 |
| 10 N Pendleton St | Middleburg | 7,219 |
| 20722 Ashburn Rd | Ashburn | 3,997 |
| 10 N Pendleton St | Middleburg | 3,078 |
| <u>10 N Pendleton St</u> | <u>Middleburg</u> | <u>2,000</u> |
| Total Class B Office Deliveries | | 655,082 |
| Class C Office Deliveries | City | Rentable Building Area |
| 39073 Irene Rd | Hamilton | 11,537 |
| <u>211 S 20th St</u> | <u>Purcellville</u> | <u>6,500</u> |
| Total Class C Office Deliveries | | 18,037 |
| Total 2006 Office Deliveries | | 1,837,310 |

| 2007 Office Deliveries | | |
|--|--------------|-------------------------------|
| Class A Office Deliveries | City | Rentable Building Area |
| 19775 Belmont Executive Plz | Ashburn | 119,619 |
| 21575 Ridgetop Cir | Sterling | 94,719 |
| 45155 Research Pl | Ashburn | 87,641 |
| 801 Sycolin Rd SE | Leesburg | 69,400 |
| 43130 Amberwood Plz | South Riding | 60,000 |
| 43490 Yukon Dr | Ashburn | 60,000 |
| 25055 Riding Plz | South Riding | 42,000 |
| Total Class A Office Deliveries | | 533,379 |
| Class B Office Deliveries | City | Rentable Building Area |
| 44675 Cape Ct | Ashburn | 132,240 |
| 23725 Overland Dr | Dulles | 86,810 |
| 22400 Shaw Rd | Sterling | 75,963 |
| 21430 Cedar Dr | Sterling | 49,671 |
| 205 E Hirst Rd | Purcellville | 45,000 |
| 24801 Pinebrook Rd | Chantilly | 21,540 |
| 116 N Bailey Ln | Purcellville | 13,108 |
| 409-413 Browning Ct | Purcellville | 11,095 |
| 19460 Golf Vista Plz | Leesburg | 5,000 |
| Total Class B Office Deliveries | | 440,427 |
| Class C Office Deliveries | City | Rentable Building Area |
| 23725 Overland Dr | Sterling | 13,224 |
| Total Class C Office Deliveries | | 13,224 |
| Total 2007 Office Deliveries | | 987,030 |

| 2008 Office Deliveries | | |
|--|--------------|-------------------------------|
| Class A Office Deliveries | City | Rentable Building Area |
| 22970 Indian Creek Dr | Sterling | 128,477 |
| 45600 Woodland Rd | Sterling | 110,886 |
| 45610 Woodland Rd | Sterling | 107,809 |
| 224 Cornwall St | Leesburg | 95,000 |
| 44160 Scholar Plz | Leesburg | 84,000 |
| 161 Fort Evans Rd NE | Leesburg | 65,000 |
| 20116 Ashbrook Pl | Ashburn | 60,000 |
| 44095 Pipeline Plz | Ashburn | 57,800 |
| 45100 Warp Dr | Sterling | 41,888 |
| Total Class A Office Deliveries | | 750,860 |
| Class B Office Deliveries | City | Rentable Building Area |
| 21625 Red Rum Dr | Ashburn | 54,560 |
| 540 Fort Evans Rd NE | Leesburg | 33,000 |
| 552 Fort Evans Rd NE | Leesburg | 33,000 |
| 921 E Main St | Purcellville | 6,000 |
| Total Class B Office Deliveries | | 126,560 |
| Total 2008 Office Deliveries | | 877,420 |

| 2009 Office Deliveries | | |
|--|-------------|-------------------------------|
| Class A Office Deliveries | City | Rentable Building Area |
| 20130 Lakeview Center Pl | Ashburn | 102,732 |
| 20135 Lakeview Center Pl | Ashburn | 102,065 |
| 19500 Sandridge Way | Lansdowne | 87,327 |
| 44933 George Washington Blvd | Ashburn | 25,000 |
| Total Class A Office Deliveries | | 317,124 |
| Class B Office Deliveries | City | Rentable Building Area |
| 44901 Russell Branch Pky | Ashburn | 115,775 |
| 24805 Pinebrook Rd | Chantilly | 48,534 |
| 1507 Dodona Ter SE | Leesburg | 41,786 |
| 20915 Ashburn Rd | Ashburn | 23,655 |
| 1503 Dodona Ter SE | Leesburg | 10,300 |
| 1509 Dodona Ter SE | Leesburg | 10,300 |
| 116 W Washington St | Middleburg | 3,600 |
| Total Class B Office Deliveries | | 253,950 |
| Total 2009 Office Deliveries | | 571,074 |

| 2010 Office Deliveries | | |
|--|-------------|-------------------------------|
| Class A Office Deliveries | City | Rentable Building Area |
| 1602 Village Market Blvd SE | Leesburg | 121,000 |
| Total Class A Office Deliveries | | 121,000 |
| Class B Office Deliveries | City | Rentable Building Area |
| 45431 Ruritan Cir | Sterling | 7,000 |
| Total Class B Office Deliveries | | 7,000 |
| Class C Office Deliveries | City | Rentable Building Area |
| 19301 Windmeade Dr | Lansdowne | 1,045 |
| Total Class C Office Deliveries | | 1,045 |
| Total 2010 Office Deliveries | | 129,045 |

| 2011 Office Deliveries | | |
|--|--------------|-------------------------------|
| Class B Office Deliveries | City | Rentable Building Area |
| 20701 Cooperative Way | Sterling | 141,000 |
| 24600 Millstream Dr | Aldie | 90,539 |
| Total Class B Office Deliveries | | 231,539 |
| Class C Office Deliveries | City | Rentable Building Area |
| 202 Church St SE | Leesburg | 10,000 |
| 610 E Main St | Purcellville | 7,148 |
| Total Class C Office Deliveries | | 17,148 |
| Total 2011 Office Deliveries | | 248,687 |

| 2012 Office Deliveries | | |
|--|-----------------|-------------------------------|
| Class B Office Deliveries | City | Rentable Building Area |
| 163 Fort Evans Rd NE | Leesburg | 25,696 |
| 201 Loudoun St | Leesburg | 13,303 |
| <u>106 Harrison St SE</u> | <u>Leesburg</u> | <u>11,300</u> |
| Total Class B Office Deliveries | | 50,299 |
| Total 2012 Office Deliveries | | 50,299 |

| 2013 Office Deliveries | | |
|--|-----------------|-------------------------------|
| Class A Office Deliveries | City | Rentable Building Area |
| 20365 Exchange St | Ashburn | 54,000 |
| 20405 Exchange St | Ashburn | 54,000 |
| 21001 Sycolin Rd | <u>Ashburn</u> | <u>27,654</u> |
| Total Class A Office Deliveries | | 135,654 |
| Class B Office Deliveries | City | Rentable Building Area |
| <u>209 Church St SE</u> | <u>Leesburg</u> | <u>3,000</u> |
| Total Class B Office Deliveries | | 3,000 |
| Total 2013 Office Deliveries | | 138,654 |

| 2014 Office Deliveries | | |
|--|------------------|-------------------------------|
| Class A Office Deliveries | City | Rentable Building Area |
| <u>19490 Sandridge Way</u> | <u>Lansdowne</u> | <u>54,121</u> |
| Total Class A Office Deliveries | | 54,121 |
| Total 2014 Office Deliveries | | 54,121 |

| 2015 Office Deliveries | | |
|--|-------------------|-------------------------------|
| Class A Office Deliveries | City | Rentable Building Area |
| <u>43777 Central Station Dr</u> | <u>Ashburn</u> | <u>49,099</u> |
| Total Class A Office Deliveries | | 49,099 |
| Class B Office Deliveries | City | Rentable Building Area |
| 22365 Broderick Dr | Sterling | 33,000 |
| <u>115 The Plains Rd</u> | <u>Middleburg</u> | <u>13,500</u> |
| Total Class B Office Deliveries | | 46,500 |
| Total 2015 Office Deliveries | | 95,599 |

ATTACHMENT 3

Key Definitions

Disclaimer: The terms and definitions are those used in the development of the report and their meaning should be maintained in that context and not any legal definition.

Aerotropolis: An urban plan in which the layout, infrastructure, and economy is centered on an airport, existing as an airport city. It is similar in form and function to a traditional metropolis, which also contains a central core that's connected-linked to its commuter suburbs.

Airport City: Area that includes the airport passenger and cargo terminals and land developments within the airport property including hotels, logistic centers, office buildings, retail facilities and all other facilities and planned development within the "airport fence".

Airport Compatible Land Use: Use of lands adjacent to, or in the immediate vicinity of, the airport that is consistent with activities and purposes compatible with normal airport operations and its environment including aircraft landing and takeoff.¹⁵

Airport Region: Areas that surround the airport within a 20 mile radius

Close Proximity to the Airport: Areas adjacent or in immediate proximity to an airport.

DNL: Day-Night Average Sound Level (DNL) is a noise metric descriptor that is calculated by cumulatively averaging sound levels over a 24-hour period. This average cumulative sound exposure includes the application of a 10-decibel penalty to sound exposures occurring during the nighttime hours (10:00 PM to 7:00 AM). DNL is the metric of choice for determining long-term community noise exposure in the airport noise compatibility planning provisions of 14 C.F.R. Part 150.

FAA Definition of Compatible Land Use: Compatibility of land use is attained when the use of adjacent property neither adversely affects flight operations from the airport nor is itself adversely affected by such flight operations. In most cases, the adverse effect of flight operations on adjacent land results from exposure of noise sensitive development, such as residential areas, to aircraft noise and vibration. Land use that adversely affects flight operations is that which creates or contributes to a flight hazard.

Flight Path: The precise route taken or due to be taken through the air by an aircraft

Incompatible Land Use: Use of lands adjacent to, or in close vicinity of, the airport that is not consistent with activities and purposes compatible with normal airport operations and its environment including aircraft landing and taking off.

Mixed Used Development: Land use development that includes retail, office, light industrial, warehousing and logistics centers but does not include any form of residential development

Noise Contours: According to FAA's definition FAA noise contours depict levels of aircraft noise surrounding an airport.

¹⁵ Based in Order 5190.6B FAA Airport Compliance Manual, Chapter 20 Compatible Land Use and Airspace Protection

Part 77: Ruling issued on July 21, 2010 by the Federal Aviation Administration (FAA) known as 49 CFR 77—Safe, Efficient Use, and Preservation of the Navigable Airspace to prescribe: the standards used to determine obstructions to air navigation, and navigational and communication facilities; the process for aeronautical studies of obstructions to air navigation or navigational facilities to determine the effect on the safe and efficient use of navigable airspace, air navigation facilities or equipment; the requirements to provide notice to the FAA of certain proposed construction, or the alteration of existing structures and the process to petition the FAA for discretionary review of determinations, revisions, and extensions of determinations.

Part 150: Ruling issued on September 24, 2004 by the Federal Aviation Administration (FAA) known as 14 CFR 150 Airport Noise Compatibility Planning to prescribe the procedures, standards, and methodology governing the development, submission, and review of airport noise exposure maps and airport noise compatibility programs, including the process for evaluating and approving or disapproving those programs.

Residential Development: Land development that include all forms of residential dwellings including single family houses, multi-family buildings, apartments, duplexes, trailer parks, co-ops, and condominiums.

Restricted Areas: Areas where development is restricted based on conditions that apply to the area.

ATTACHMENT 4

A: Key Findings from Stakeholder Interviews

The purpose of this attachment is to summarize key findings from stakeholder interviews conducted by HR&A and Kimley-Horn as part of the Loudoun County Station Area Market Analysis outreach.

Over the course of two weeks, the team held 11 conversations with a range of County Staff, development entities, and local land owners to gain a deeper understanding of some of the challenges and opportunities of development in Loudoun County. Please see a complete list of stakeholders on page 5-25.

KEY FINDINGS

- Differences between zoning and the proposed land uses in the comprehensive plan create opportunities for developers to propose land uses that are not aligned with the County's long-term development goals.
- The political nature of the Board of Supervisors can create uncertainty in the development process since public perception may influence approvals more than market realities and approvals can be difficult to obtain during reelection season.
- Even with residential demand forecasts greater than the land available for residential development, the residential density of previous residential development is lower than the allowed zoning. The discrepancy in development density and allowable density may be due to a lack of familiarity with multi-family development from members of the Board of Supervisors and local developers.
- Loudoun County has a limited number of multi-family developments that offer smaller, more affordable units. As a result, the County is struggling to retain younger workers who are being priced out of the market.
- Developers are struggling to attract residents, retailers and tenants since most of the land at the Station Areas is lacking a sense of place. By leading with public amenities, such as parks and community spaces, the County could seed the development process and begin to create a sense of place.
- Funding for roads and infrastructure has historically been reactive with limited proactive strategies to guide development.
- The County's ability to offer financial support and infrastructure investments at the Station Areas could improve the financial feasibility of proposed development projects.
- In the near-term, office development in Loudoun County at the Station Areas is likely to attract suburban office tenants who want to be closer to transportation and in a more urban setting.
- Regionally competitive office space will be located in an area filled with amenities for office workers and in a mixed-use environment.
- The combination of data centers and a growing population base has created a strong flex-industrial market with speculative development and a vacancy rate of 7.1%

Section 5: Appendix

- Retail development in Loudoun County may be slow to occur until the resident and worker population increases to generate more demand.
- Flexible, by-right zoning designations would allow developers to be more responsive to market conditions and modify proposed development amendments through a faster administrative process than the current legislative process which can be slow.
- Increased cargo shipping at Dulles Airport would require freight forwarders to connect cargo from the airport to the end users; regional exports to fill incoming belly cargo at Dulles; and improvements to the existing road infrastructure to increase connectivity to Dulles Airport.
- Land at Dulles International Airport could be leveraged as part of a larger development plan at the Loudoun Gateway Station to achieve a critical development density on site.
- Increasing numbers of international tourists could generate demand for hospitality and entertainment uses which offer an authentic experience, such as home cooked meals, international brands or other cultural events such as cricket matches.

List of Stakeholders Interviewed

1. Mark Hassenger, President, West Dulles Properties
2. Chris Antigone, Owner, Dulles Gateway Associates
3. Logan Antigone, Sales Person, Dulles Gateway Associates
4. Maggie Parker, Director, Comstock Partners LC
5. Randy Sutliff, Deputy Executive Director of Operations, The Claude Moore Charitable Foundation
6. Todd Pearson, Vice President of Acquisitions and Development, BF Saul Company and Member of the Nighttime Advisory Commission
7. Mary Beth Avedesian, Senior Vice President, BF Saul Company
8. Chuck Stipancic, President and Chief Executive Officer, Aviation Facilities Company
9. Michael Cooper, Manager of State and Local Government Affairs, Metropolitan Washington Airports Authority
10. Jerome Davis, Executive Vice President and Chief Revenue Officer, Metropolitan Washington Airports Authority
11. Van Armstrong, Program Manager, Loudoun County Department of Planning and Zoning
12. Cindy Keegan, Program Manager for Community Planning, Loudoun County Department of Planning and Zoning
13. Miguel Salinas, Assistant Director, Loudoun County Department of Economic Development
14. Richard Besinger, Business Development Manager, Loudoun County Department of Economic Development
15. Katie McConnell, Manager of Strategic Initiatives, Loudoun County Department of Economic Development
16. Beth Hilkemeyer, Research Manager, Loudoun County Department of Management and Financial Services
17. Jill Kaneff, Demographer, Loudoun County Department of Planning and Zoning
18. Richard Klusek, Senior Planner, Community Planning, Loudoun County Department of Planning and Zoning

B: Summary of Key Studies Reviewed by the HR&A Team

Market and Fiscal Impact Analysis of Phase 2 Metrorail Extension to Loudoun County, prepared by Robert Charles Lesser & Co., April 2012

In 2012, Robert Charles Lesser & Co. (RCLCO) studied the impacts of extending the Dulles Rail Corridor from the proposed Wiehle Avenue stop, to a terminus at Route 772 (Ashburn Station) in Loudoun County. RCLCO's analysis indicated that Loudoun County's investment in Phase 2 of the Dulles Corridor Metrorail Extension to Route 772 would generate a positive fiscal impact of \$425.5 million higher (constant 2011 dollars) than the extension to Wiehle Avenue. Market forecasts by RCLCO suggest the additional investment in Metrorail would also generate additional countywide development by 2040 and contribute to an additional nine percent growth in the number of housing units, seven percent growth in office square footage, nine percent growth in retail square footage, and six percent growth in the number of hotel rooms. Increased accessibility by Metrorail will enable Loudoun County to cater to a broader range of businesses and residents, and capture a larger piece of the Washington Metro Regional real estate market.

HR&A's Assessment: RCLCO's assessment of Loudoun County's financial investment in the extension of the Dulles Rail Corridor indicated the investment would generate additional development activity in the County. Development projections may not account for a slow office market and growing competition from office development at Tysons Corner and Route 28.

Harvesting the Value of Metrorail in Loudoun County, Virginia, by ULI Washington Technical Assistance Panel (TAP) for Loudoun County, May 2014

The Urban Land Institute, through its Advisory Services Program conducted an assessment of Loudoun County's Revised General Plan, to determine if the structure of the land-use plans and zoning ordinance would support long-term growth and employment in Loudoun County. Members of the Technical Assistance Panel, interviewed local stakeholders, conducted a site tour, reviewed county market trends for real estate, infrastructure, transit-oriented development, and current and proposed land use to arrive at a series of recommendations for the County. Key findings to support holistic development of the 606 and 772 Station Areas focused on opportunities to create vibrant mixed-use development that appeals to a variety of individuals. Office development should not be the dominant use at the proposed stations. Instead the County should encourage a walkable, mixed-use environment and encourage a diverse land use pattern to avoid the creation of a "mono-culture" that detracts from an urban-feeling environment. If office is to be included in a land-use plan, the ULI TAP recommended smaller office spaces which provide shared and flexible workspaces which appeal to a generation of younger workers.

HR&A Assessment: The ULI TAP recommendations reviewed development projections in light of the challenging office market conditions of the Washington Metro Region and positioned the stations to capture alternative development opportunities. A range of development options should be considered at the station in the context of proximity to the airport and other factors driving regional demand.

Urban Land Institute Washington Technical Assistance Panel, Briefing Book, prepared by Loudoun County Government Dept. of Planning, April 2014

Loudoun County prepared a briefing book in advance of the 2014 Urban Land Institute Technical Assistance Panel's visit to Loudoun County. The County's briefing book provided high-level information on the County, and specifically around the sites of the future Metrorail stations. Information included an overview of county forecasts concerning the economy, employment, housing, and planned developments. Along with information on existing tax assessments, County zoning, environmental conditions and development approved and planned for the stations.

HR&A Assessment: The County's Technical Assistance Panel Briefing Book provided a high-level compilation of key information the County perceived as relevant to development opportunities and challenges at the proposed 606 and 772 Stations. While growth projections indicate opportunity to leverage development immediately around the stations, regional competition for development, local zoning limitations, and previous proffers may limit development at the stations.

Loudoun County, Virginia, Department of Economic Development 2014 Annual Report

Loudoun County experienced one of the fastest growing economies in the country, and the expansion of the Metrorail will further usher in a new phase of growth and development in Loudoun County. To ensure long-term economic success the County's economic development team has focused on bolstering current industries and has attracted additional businesses in the information and communications technology spaces. In addition, data centers remain a critical source of county revenue and generate more than \$60 million in annual revenue. To diversify the current economy, from its concentration in technology and information, the County set up a Viticulture and Enology Education Center (VEEC) that will encourage growth in jobs in "D.C.'s Wine Country" by attracting more visitors and developing more skilled labor the industry. And focused on developing an entrepreneurial culture in the County and developed iNNOVATE LoCo, a tech pitch competition to support local entrepreneurs.

HR&A Assessment: This study highlights the key industry sectors which have generated tremendous economic growth in Loudoun County and identifies additional sectors with opportunities for the diversification of the economy. As alternative industries grow in Loudoun County, understanding future office needs, employment demands and likely growth will be critical to provide an environment which supports industry growth.

Metrorail Parking Demand Study: Route 606 and 772 Station Commuter Parking Demand Forecast

DESMAN Associates conducted a feasibility analysis of the cost to Loudoun County to construct and operate parking garages at the 606 and 772 Stations. The analysis sought to understand the capital costs and ongoing operational costs of the two parking garages, and if the entities would be financially sustainable without a subsidy provided through County taxes. DESMAN's analysis determined the proposed capacity of the parking garages would meet demand from Metrorail station use and the Dulles Metrorail Corridor and projected parking garage fees would cover the costs to construct and operate the parking garages.

HR&A's Assessment: The study indicates that one of the primary roles for the stations is to serve as a gateway for commuters in the County to access the Metrorail System and substantial demand exists for parking facilities to accommodate rail users and regional commuters.

Final Environmental Impact Statement, by Federal Transit Administration for Dulles Corridor Rapid Transit Project

The Final Environmental Impact Study for the Dulles Corridor Rapid Transit Project examined the long-term and immediate transit effects of three transit alternatives: Phase 1 with no extension to Wiehle Avenue; the completion of Phase 1 with an extension to Wiehle Avenue; and the completion of Phase 2, with a Metrorail terminus at the 772 Station. The Environmental Impact Study provided an overview of transit conditions throughout Loudoun County, including the types and frequency of service, station areas, and transit facilities. Ultimately the extension of the Metrorail to the 772 Station would attract 41,600 new average weekday trips in its opening year, while the shorter Wiehle Avenue extension would only bring in an additional 29,100 trips in its opening year.

HR&A's Assessment: This study provided the economic rationale for extending the Silver Line into Loudoun County. The additional 12,500 daily Metrorail riders from the 606 and 772 Stations will create demand for office, retail, parking, residential and other commercial uses at the two stations.

Analysis of Population and Employment Forecasts for Washington DC Region, 2010-2040, by Renaissance Planning Group for the Metropolitan Washington Airports Authority, October 2011

The Renaissance Planning Group (RPG) conducted an independent economic analysis of socioeconomic data used by the Metropolitan Washington Airports Authority (MWAA) to anticipate future travel demand in the Washington DC Metropolitan Area. The study was done to support a traffic and revenue study by Wilbur Smith Associates (WSA) to forecast traffic and toll revenue along the Dulles Toll Road. Key observations include:

- Loudoun County experienced the highest rate of population and employment growth between 2000 and 2010 in comparison to other regional localities such as Fairfax County, Arlington County, the City of Alexandria, and Prince William County.
- County Staff have been actively preserving elements of Loudoun County's agrarian past, including open land in the western part of the County. Expecting demand in Loudoun County will continue to grow, new residential development could be channeled into higher density development on the eastern portion of the County to preserve open land in the western portion.
- The Dulles Toll Road area, the primary study area, is and will continue to be the "preferred growth corridor for the region", partly due to the Metrorail extension which will make the area more desirable. Fairfax has experienced growth for this reason, and Loudoun County is expected to as well.¹⁶

HR&A's Assessment: This study provided a comparison of the economic trends seen in Loudoun County to comparable counties within the region, including an analysis of employment trends and population growth.

¹⁶ Analysis of Population and Employment Forecasts for Washington DC Region, 2010-2040, by Renaissance Planning Group for the Metropolitan Washington Airports Authority, October 2011

Analysis of the development potential of the Metrorail expansion should build from the regional growth created by the Dulles Toll Road and identify opportunities to leverage the two transportation routes as an economic driver for the County.

Station Site Plan Analysis Report, by Dulles Rail Consultants for the Metropolitan Washington Airports Authority, July 2011

Dulles Rail Consultants conducted a comparative analysis of plans for Metrorail stations along the Dulles Metrorail Corridor Extension, comparing the previously conducted Final Environmental Impact Statement (FEIS) and the Preliminary Engineering documents (PE). Design elements for the 606 Station included components to support multi-modal transportation, such as drop-off spaces for commuters transitioning from vehicles to Metrorail. In addition, a review of the traffic pattern around the 606 Station, and proposed traffic planning based on 2030 traffic demand indicated that planned construction around the 606 Station will meet demand projections. The 772 Station analysis was divided between a South and North Station, with the North Station site falling under several transit-related proffers associated with Loudoun Station and the Ryan Park Center. These development proffers will provide parking facilities, multi-modal transportation transfers, and site infrastructure to increase accessibility. Infrastructure for the South Station Site will be provided through proffers from the Moorefield Station development, including roadways to connect the Station to the surrounding community, parking spaces, bus bays, and a proposed parking garage.

HR&A's Assessment: This study provided an overview of the proposed site infrastructure for the 606 and 772 Stations to connect the Stations to the surrounding community. The development of bicycle and pedestrian infrastructure is based on proffers with adjacent development sites.

Loudoun County Revised General Plan "Chapter 6 Suburban Policy Area"

Planned land use for Loudoun County's Suburban Policy Area is found in Chapter 6 of the Loudoun County Comprehensive Plan. The Suburban Policy Area is found in the eastern portion of Loudoun County and encompasses 60,000 acres, boundaries are the Potomac River to the north, Braddock Road in the south, Fairfax County in the east, and, "the Goose Creek and Beaverdam Reservoirs and a combination of property lines, roads, the power line easement, and [Dulles Airport]'s 65 LDN noise contours"¹⁷¹⁸ to the West. The Policy Area is home to Dulles Airport, and four distinct communities: Ashburn, Dulles, Potomac, and Sterling.

Goals of the Suburban Policy Area are to preserve the unique character of each community and provide distinct economic development opportunities for each community. To foster a livable community, the plan promotes the following goals: 1) "protecting and enhancing elements of Green Infrastructure, including

¹⁷ Loudoun County Government Revised Comprehensive Plan, Chapter 6: Suburban Policy Area

¹⁸ The Loudoun County Airport Impact (AI) Overlay District zoning ordinance uses the acronym LDN to refer to noise level categories. According to the Revised 1993 Zoning Ordinance, AI-Airport Impact Overlay District § 4-1406 (A) (2015), Ldn: The symbol for "yearly day-night average sound level", which means the 365-day average, in decibels, for the period from midnight to midnight, obtained after the addition of ten decibels to sound levels for the periods between 10 p.m. and 7 a.m., local time. The Federal Aviation Administration uses the acronym DNL (Day-Night Average Sound Level) to refer to the same noise categories. This report uses LDN when referring to the Loudoun County AI Overlay District zoning ordinance and DNL when referring to FAA rules.

open space; 2) ensuring compatible and complementary infill development; and 3) revitalizing existing neighborhoods in a way that protects and enhances our existing communities.”¹⁹ The plan includes policy guidance for green infrastructure, open space, water and wastewater, transportation, infill development, revitalization, and redevelopment. The Plan differentiates between the distinctive traits and policies for differing planned land use areas, such as residential areas and urban centers, the Route 28 Corridor Plan, transit-oriented development, and transit-related employment centers.

HR&A Assessment: The Suburban Policy Area section of the Loudoun County Revised General Plan details the development, and land use goals and policies specific to the communities in eastern Loudoun County. This document provided a broader overview of the land-use policies created by the Suburban Policy Area and how development patterns at the 606 and 772 Stations will align with existing development goals.

2013 Fiscal Impact Committee Guidelines: Demographic, Economic, and Fiscal Assumptions and Forecasts, prepared by the Loudoun County Fiscal Impact Committee, Jan/Feb 2014

The Fiscal Impact Committee of the Loudoun County Board of Supervisors drafted forecasts of the residential and nonresidential development of Loudoun County through 2040. Conditions influencing the study included the current market conditions, as well as long-run land supply based on current planning and zoning. Key findings relevant to HR&A’s market analysis include:

- The population of Loudoun County is expected to grow from 367,096 residents in 2015 to 453,202 residents in 2025 or an increase of 23 percent, and to 488,111 residents by 2040 for a total increase of 33 percent above the 2015 population.
- The number of jobs in the County is projected to increase by 35 percent, from 164,173 jobs in 2015 to 222,014 jobs in 2025. By 2040, jobs will have increased by 68 percent, from 164,173 jobs in 2015 to 275,552 jobs in 2040.
- The number of housing units is expected to increase from 127,729 in 2015 to 158,729 in 2025 and 173,729 in 2040; a 24% and 36% increase respectively.
- Non-residential square footage is expected to more than double in the next 35 years, from 60 million in 2015 to 143 million in 2040, a 138% increase. In 2025, the Committee forecasts a 98% increase to 119 million square feet of non-residential space.²⁰

HR&A Assessment: The Fiscal Impact Committee provided an assessment of Loudoun County’s current population and employment, along with forecasts for long-term population and employment growth. In addition to growth projections, the Committee provided demand projections for residential and non-residential (office, retail, industrial and public facilities) square footage to support a growing population base. This document provides a foundation for the projected growth and subsequent demand for housing, office, and retail uses in Loudoun County.

Loudoun County, “Revised 1993 Zoning Ordinance, As amended through April 8, 2015.” Section 4-1000 PD-TREC Planned Development –Transit Related Employment Center and Section 4-1100 PD TRC-Transit Related Center

¹⁹ Loudoun County Government Revised Comprehensive Plan, Chapter 6: Suburban Policy Area

²⁰ Loudoun County Board of Supervisors Fiscal Impact Committee, “2013 Fiscal Impact Committee Guidelines: Demographic, Economic, and Fiscal Assumptions and Forecasts Draft,” February 2014.

Section 5: Appendix

Loudoun County's amended zoning ordinance includes two land use zoning designations which directly influence development at the proposed station areas, Transit Related Employment Center (TREC) and Transit Related Center (TRC) which are designed to promote mixed-use development in an urban setting which includes higher-density development, a walkable and pedestrian friendly environment with connectivity to public transportation. Key differences exist between the County's TREC and TRC designations, the TRC designation has been mapped as a County land use, while the TREC designation is a County policy and land owners must opt-into the rezoning as part of a rezoning application. Additionally, TRC zoning allows for residential land use, while the TREC designation prohibits residential use. Both designations allow for a range of by-right development support mixed-use development and encourage a high-density development pattern.

HR&A Assessment: The Revised 1993 Zoning Ordinance indicates the County's desire to encourage high-density, urban form development on the land surrounding the proposed station areas. Through the current zoning ordinance, the County has taken steps to identify the mix of uses and design guidelines which would create a vibrant, walkable, and urban style development pattern in Loudoun County.

ATTACHMENT 5

Detailed Overview of Trends and Forecasts for Dulles and Regional Airports

Dulles International Airport is one of three major airports in the Washington Metropolitan region. Washington Dulles International Airport (Dulles Airport), located in southeastern Loudoun County and western Fairfax County, is owned and operated by the Metropolitan Washington Airports Authority (MWAA). Dulles Airport opened in 1962 with two parallel north-south runways and the capacity to serve six million passengers annually, capacity has since increased and Dulles Airport served nearly 22 million passengers in 2013.²¹ Dulles Airport is located on an 11,830 acre parcel that spans Loudoun and Fairfax Counties, approximately 26 miles to the west of Washington, DC. Access to the airport is primarily by the 16-mile Dulles Airport Access Road which provides two dedicated lanes in each direction with direct connections to I-66 and I-495.

Today, Dulles Airport has become a major hub for both domestic (83 non-stop U.S Destinations) and international flights (50 non-stop international destinations). As of 2013, Dulles Airport served an average of 21.9 million passengers across 135 airline gates. The last major improvements to Dulles Airport included the construction of an automated people mover AeroTrain system (2009) and a major expansion of the International Arrivals Building (2011). WMATA's Metrorail's Silver Line is planned to extend to Dulles Airport by 2020. It is estimated that, with minor expansion, Dulles Airport could accommodate 45 million annual passengers. The full construction program for Dulles Airport (the Dulles Development program) will advance the capacity of Dulles Airport to the levels it was envisioned in its Master Plan, serving 55 million annual passengers a year.

Land use in the vicinity of Dulles Airport is generally a mix of light industry, small-format office, and undeveloped properties. With the soon to be extended WMATA Silver Line Metrorail to the Airport and beyond to Loudoun County, land uses around and in the vicinity of the Airport are expected to change into higher-density development and additional commercial uses as the area becomes more developed.

Regional airport competitors to Dulles Airport include:

- **Reagan National Airport (DCA)**, located in Arlington County, VA, is also owned and operated by the Metropolitan Washington Airports Authority (MWAA). DCA opened with a single hangar in 1941 and operated with a single terminal until undergoing a major expansion in 1997 from one terminal to three.
 - As of 2012, DCA maintained 44 airline gates on 860 acres, carrying 19.7 million passengers to 84 nonstop destinations. The latest major improvements at Reagan National – modernizing the airport's original Terminal A – have been ongoing over the past 3 years.
 - DCA is located along the WMATA Metrorail, providing access to Washington, DC and other regional destinations. It's bordered on much of the east and south by the Potomac River, with a military base on the opposing bank. To the west is the Crystal City area of Arlington County – a dense urban core with mixed-use buildings including office space, residential, and the Pentagon City Mall. Beyond the initial inner ring of mixed-use office

²¹ MWAA "Total Operations, Passengers, Mail, & Freight Activities, Calendar Years 1962 – 2013"
<http://www.metwashairports.com/dulles/653.htm>

and hotel is a low-density mixed-use residential neighborhood with large-lot residential and other low-density uses such as a country club and the Arlington National Cemetery.

- **Baltimore/Washington International Thurgood Marshall Airport (BWI)**, located in Anne Arundel County, Maryland, is owned and operated by the Maryland Aviation Administration (MAA). BWI was originally constructed in the late 1940s but underwent a major modernization program in the late 1970s. Its most recent renovations occurred in 2005 when Concourses A and B were expanded and renovated to house the operations of Southwest Airlines, which carries a major share of BWI passengers. A major terminal enhancement program that began in the summer of 2012 is ongoing, as are continued runway and pavement rehabilitation efforts.
 - Overall land use patterns around BWI have not changed significantly in the past 20 years. A large portion of the immediate surrounding area is zoned industrial or open space. The exception is the sizeable area of medium density residential development in Ferndale to the northeast. Most areas beyond are low or low-medium density residential, with more commercial development towards Glen Burnie.
 - In the past eight years, initiatives have come forth to rezone areas in the vicinity of the BWI Amtrak station to mixed-use transit uses in an effort to implement an Airport City or “Aerotropolis” concept. 3.5 million square feet of land just north of the airport has already been developed, with another close to 200 acres of land planned for the development of luxury apartments, townhomes, and condos.

Total passenger volume at Dulles International Airport has declined as regional competitors have seen increases in passenger volume. Passengers served by the area’s regional airports between 2009 and 2014 on domestic and international flights (not including Military and passengers from non-commercial operations) are described in Figure 5-1: Historic Annual Domestic Passenger and Figure 5-2 : Historic Annual International Passengers.

| Figure 5-1: Historic Annual Domestic Passenger | | | | | | |
|--|-----------------------------|-----------------------|--------------------------------------|-----------------------|------------------|-----------------------|
| Year | Dulles Airport ¹ | | Reagan National Airport ² | | BWI ³ | |
| | Passengers | Percent annual growth | Passengers | Percent annual growth | Passengers | Percent annual growth |
| 2009 | 16,964,895 | - | 17,295,515 | - | 20,503,786 | - |
| 2010 | 17,214,302 | 1.47% | 17,813,217 | 2.99% | 21,411,843 | 4.43% |
| 2011 | 16,663,433 | -3.20% | 18,546,137 | 4.11% | 21,808,464 | 1.85% |
| 2012 | 15,881,927 | -4.69% | 19,267,015 | 3.89% | 21,975,916 | 0.77% |
| 2013 | 14,812,076 | -6.74% | 19,989,901 | 3.75% | 21,654,879 | -1.46% |
| 2014 | 14,321,199 | -3.31% | 20,389,458 | 2.00% | 21,448,107 | -0.95% |

¹ Historic Freight at IAD from MWAA Air Traffic Statistics 2009-2014

² Historic Freight at DCA from MWAA Air Traffic Statistics 2009-2014

³ Historic Freight at BWI from <http://www.bwiairport.com/en/about-bwi/factsfigures/cargovolume>

As seen above, Dulles Airport has experienced a significant decline in domestic passengers since 2010 while Reagan National showed steady growth for the period. BWI increased until 2012 with a small decline since in 2013 and 2014. Much of this trend can be explained by:

- Changes in Federal government policies related to eliminating some of the perimeter rule constraints at Reagan National allowing for non-stop flights to destinations previously served from Dulles Airport.
- Aggressive economic incentives by BWI and pricing by the airlines operating out of the Airport to attract domestic passengers from the region.

- The addition of slots at Reagan National as part of FAA 2012 Reauthorization bill and most recently the sale of slots at Reagan National by US Airways and American Airlines to other airlines as part of the conditions imposed by the Federal government for the approval of their merger.

In contrast as shown in Figure 5-2, Dulles Airport international passenger traffic has increased and while significant increases in the international passenger market are being realized at Reagan National (traffic to Canada) and at BWI. Dulles Airport is still by far the dominant international airport.

| Figure 5-2 : Historic Annual International Passengers | | | | | | |
|---|-----------------------------|-----------------------|--------------------------------------|-----------------------|------------------|-----------------------|
| Year | Dulles Airport ¹ | | Reagan National Airport ² | | BWI ³ | |
| | Passengers | Percent annual growth | Passengers | Percent annual growth | Passengers | Percent annual growth |
| 2009 | 6,248,446 | - | 272,580 | - | 449,829 | - |
| 2010 | 6,382,924 | 2.15% | 292,585 | 7.34% | 524,618 | 16.63% |
| 2011 | 6,548,423 | 2.59% | 256,257 | -12.42% | 583,321 | 11.19% |
| 2012 | 6,679,594 | 2.00% | 363,198 | 41.73% | 703,971 | 20.68% |
| 2013 | 6,984,250 | 4.56% | 402,770 | 10.90% | 836,467 | 18.82% |
| 2014 | 7,099,186 | 1.65% | 394,926 | -1.95% | 864,569 | 3.36% |

1 Historic Freight at IAD from MWAA Air Traffic Statistics 2009-2014

2 Historic Freight at DCA from MWAA Air Traffic Statistics 2009-2014

3 Historic Freight at BWI from <http://www.bwiairport.com/en/about-bwi/factsfigures/cargovolume>

Regional competitors are gaining a larger share of domestic and international passengers. Total passengers served by the area's regional airports between 2009 and 2014, including both domestic and international flights, are described in Figure 5-3: Historic Annual Total Passengers. Year 2005 is included for later comparison with economic trends in other sections. Forecast of future passengers totals are shown in Figure 5-4: Forecast Annual Total Passengers

| Figure 5-3: Historic Annual Total Passengers | | | | | | |
|--|-----------------------------|-----------------------|--------------------------------------|-----------------------|------------|-----------------------|
| Year | Dulles Airport ¹ | | Reagan National Airport ² | | BWI | |
| | Passengers | Percent annual growth | Passengers | Percent annual growth | Passengers | Percent annual growth |
| 2005 | 27,052,118 | - | 17,847,884 | - | | - |
| 2009 | 23,213,341 | - | 17,577,359 | - | 21,030,736 | - |
| 2010 | 23,597,226 | 1.65% | 18,118,713 | 3.08% | 22,001,946 | 4.6% |
| 2011 | 23,211,856 | -1.63% | 18,823,094 | 3.89% | 22,450,082 | 2.0% |
| 2012 | 22,561,521 | -2.80% | 19,655,440 | 4.42% | 22,734,074 | 1.3% |
| 2013 | 21,796,326 | -3.39% | 20,415,085 | 3.86% | 22,540,034 | -0.9% |
| 2014 | 21,420,385 | -1.72% | 20,810,387 | 1.94% | 22,365,368 | -0.8% |

1 Historic Freight at IAD from MWAA Air Traffic Statistics 2009-2014

2 Historic Freight at IAD from MWAA Air Traffic Statistics 2009-2014

Based on the historic data, Dulles Airport has seen a reduction in the number of annual passengers that use the airport. This is in contrast to the year over year growth that has been generally observed at both Reagan National Airport and BWI Airport. Since 2009, the total number of passengers using Dulles Airport has dropped by an average annual rate of 1.92%, while passenger growth is up at both Reagan National and BWI during the same time period by rates of 2.81%, annually.

As observed in Figure 5-4: Forecast Annual Total Passengers despite these trends, the Washington-Baltimore Regional Air Passenger Origin Destination Forecasts from 2013 project Dulles Airport will overtake BWI Airport in terms of total number of passengers by 2015 to become the dominant Metropolitan area airport (by passengers served) over the next 25 years.²² The total number of passengers served at Dulles Airport between 2015 and 2040 is anticipated to grow by an average annual rate of 3.05%, while passenger growth at Reagan National and BWI Airports will only grow by rates of 1.0% and 2.54% during the same time period.

| Figure 5-4: Forecast Annual Total Passengers | | | | | | |
|--|----------------|-----------------------|-------------------------|-----------------------|------------|-----------------------|
| Year | Dulles Airport | | Reagan National Airport | | BWI | |
| | Passengers | Percent annual growth | Passengers | Percent annual growth | Passengers | Percent annual growth |
| 2015 | 23,216,822 | - | 20,026,342 | - | 21,900,992 | - |
| 2020 | 27,475,090 | 3.43% | 21,047,880 | 1.00% | 25,331,472 | 2.95% |
| 2025 | 31,741,444 | 2.93% | 22,121,534 | 1.00% | 29,139,192 | 2.84% |
| 2030 | 36,700,014 | 2.95% | 23,249,958 | 1.00% | 33,523,840 | 2.84% |
| 2035 | 42,468,354 | 2.96% | 24,435,944 | 1.00% | 38,573,262 | 2.85% |
| 2040 | 49,184,842 | 2.98% | 25,682,422 | 1.00% | 44,388,714 | 2.85% |

FAA and MWAA have assumed many factors that support the envisioned growth of Dulles' share of the air market. Chief among them is the further completion of the Dulles Development construction program (including a fifth runway) and the extension of the WMATA Silver Line Metrorail enhancing the connection between Dulles Airport, Washington DC, and beyond into Loudoun County.

Total freight volume at Dulles and Reagan National has declined, while BWI has maintained historic volumes.

The amount of freight by weight processed by the area's regional airports between 2009 and 2014, including both domestic and international freight, is described in Figure 5-5: Historic Annual Total Freight Volumes. The year 2005 is included for comparison with economic trends in a later section. These values do not include mail.

| Figure 5-5: Historic Annual Total Freight Volumes | | | | | | |
|---|-----------------------------|-----------------------|--------------------------------------|-----------------------|--------------------|-----------------------|
| Year | Dulles Airport ¹ | | Reagan National Airport ² | | BWI ³ | |
| | Freight (000 lbs.) | Percent annual growth | Freight (000 lbs.) | Percent annual growth | Freight (000 lbs.) | Percent annual growth |
| 2005 | 636,978.5 | - | 5,717.5 | - | | - |
| 2009 | 623,322.8 | - | 12,800.9 | - | 207,739 | - |
| 2010 | 712,203.8 | 14.3% | 14,499.8 | 13.27% | 213,779 | 2.9% |
| 2011 | 642,221.7 | -9.8% | 13,802.8 | -4.81% | 226,345 | 5.9% |
| 2012 | 572,893.9 | -10.8% | 13,138.6 | -4.81% | 235,375 | 4.0% |
| 2013 | 237,715.0 | -58.5% | 4,071.9 | -69.0% | 229,704 | -2.4% |
| 2014 | 256,358.0 | 7.8% | 3,811.8 | -6.4% | 221,577 | -3.5% |

¹ Historic Freight at IAD from MWAA Air Traffic Statistics 2009-2014

² Historic Freight at DCA from MWAA Air Traffic Statistics 2009-2014

³ Historic Freight at BWI from <http://www.bwiairport.com/en/about-bwi/factsfigures/cargovolume>

²² Forecast passengers based on 2x the number of estimated enplanements from Washington – Baltimore Regional Air Passenger Origin Destination Forecast Update (May 23, 2013).

Historic freight data shows large variations in freight operations at the three regional airports. Both Dulles Airport and Reagan National saw a significant drop in freight activity between 2012 and 2013.

Domestic and international freight volumes have steadily declined, although international freight may begin to increase. The amount of freight by weight processed by the area's regional airports between 2009 and 2014, split by domestic and international shipments, is described in Figure 5-6: Historic Domestic Freight Volumes and Figure 5-7: Historic International Freight Volumes. These values do not include mail.

| Figure 5-6: Historic Domestic Freight Volumes | | | | | | |
|---|-----------------------------|-----------------------|--------------------------------------|-----------------------|--------------------|-----------------------|
| Year | Dulles Airport ¹ | | Reagan National Airport ² | | BWI ³ | |
| | Freight (000 lbs.) | Percent annual growth | Freight (000 lbs.) | Percent annual growth | Freight (000 lbs.) | Percent annual growth |
| 2005 | 319,339.1 | - | - | - | - | - |
| 2009 | 261,650.0 | - | 14,498 | - | 202,209 | - |
| 2010 | 280,352.2 | 7.15% | 12,798 | -11.73% | 209,576 | 3.64% |
| 2011 | 252,343.3 | -9.99% | 13,801 | 7.84% | 221,096 | 5.50% |
| 2012 | 235,184.6 | -6.80% | 13,135 | -4.83% | 231,202 | 4.57% |
| 2013 | 87,587.0 | -62.76% | 4,068 | -69.03% | 225,206 | -2.59% |
| 2014 | 81,971.0 | -6.41% | 3,929 | -3.42% | 216,758 | -3.75% |

¹ Historic Freight at IAD from MWAA Air Traffic Statistics 2009-2014

² Historic Freight at DCA from MWAA Air Traffic Statistics 2009-2014

³ Historic Freight at BWI from <http://www.bwiairport.com/en/about-bwi/factsfigures/cargovolume>

| Figure 5-7: Historic International Freight Volumes | | | | | | |
|--|-----------------------------|-----------------------|--------------------------------------|-----------------------|--------------------|-----------------------|
| Year | Dulles Airport ¹ | | Reagan National Airport ² | | BWI ³ | |
| | Freight (000 lbs.) | Percent annual growth | Freight (000 lbs.) | Percent annual growth | Freight (000 lbs.) | Percent annual growth |
| 2005 | 317,639.4 | - | - | - | - | - |
| 2009 | 361,672.8 | - | 0 | - | 5,530 | - |
| 2010 | 431,851.6 | 19.40% | 0 | - | 4,203 | -24.00% |
| 2011 | 389,878.4 | -9.72% | 0 | - | 5,249 | 24.89% |
| 2012 | 337,709.3 | -13.38% | 0 | - | 4,172 | -20.52% |
| 2013 | 150,128.0 | -55.55% | 2 | - | 4,498 | 7.81% |
| 2014 | 174,387.0 | 16.16% | 1 | - | 4,819 | 7.14% |

¹ Historic Freight at IAD from MWAA Air Traffic Statistics 2009-2014

² Historic Freight at DCA from MWAA Air Traffic Statistics 2009-2014

³ Historic Freight at BWI from <http://www.bwiairport.com/en/about-bwi/factsfigures/cargovolume>

The results indicate the drop in freight volumes at Dulles Airport were for both domestic and international cargo with a larger decline in the domestic volumes, while BWI's domestic volumes have not suffered such sharp declines. The main reason for the sharp decline in domestic freight has been operational changes by Dulles Airport's largest domestic operator FedEx, which has shifted its heavier shipments to ground service, as well as changes in the passenger aircraft fleet by United Airlines to aircrafts with less cargo capacity. The sharp decline in international freight has been explained by several reasons; mainly, the economic downturn in Europe and, more importantly, the decline/drawdown in US government/military operations in Afghanistan and the Middle East.

While domestic cargo continues to decline at all three airports, international cargo showed positive increases at BWI in 2013 and 2014 and at Dulles Airport in 2014, fueled by the economic recovery in Europe and the addition of new international routes to the Middle East.

Dulles Airport creates a range of financial and economic impacts in Loudoun County and the Commonwealth of Virginia. Multiple indicators of the economic impacts of Dulles Airport and Reagan National Airport were explored, including total number of jobs (both airport and visitor generated), labor income, and state and local tax dollars (only for 2012), for Virginia, the District of Columbia, Maryland, and the overall metropolitan area. Loudoun County, Virginia, was also highlighted. Economic impact data for Dulles and Reagan National airports were collected from two studies performed by MWAA: the 2005 *Regional Economic Impact* study and the 2012 *Economic Impact Study*. The 2012 data are reported in Figure 5-8: Economic Impact – Jobs and Labor Income (2012) and Figure 5-9: Economic Impact – State and Local Taxes.

| Figure 5-8: Economic Impact – Jobs and Labor Income (2012) | | | | |
|---|------------------------------------|-----------------------------------|---|-----------------------------------|
| Location | Dulles Airport ¹ | | Reagan National Airport ¹ | |
| | Jobs | Labor Income (\$ millions) | Jobs | Labor Income (\$ millions) |
| Virginia | 146,122 | \$5,944.90 | 48,916 | \$1,944.80 |
| Loudoun County | 18,692 | \$796.36 | 2,972 | \$128.40 |
| District of Columbia | 68,345 | \$2,505.2 | 54,076 | \$1,987.5 |
| Maryland | 33,239 | \$1500.0 | 20,738 | \$750.8 |
| Total Metropolitan Area | 247,706 | \$9,950.00 | 123,730 | \$4,683.10 |

¹ Economic Impact for Dulles and Reagan National from MWAA 2012 *Economic Impact Study*

| Figure 5-9: Economic Impact – State and Local Taxes (\$ millions) (2012) | | |
|---|------------------------------------|---|
| Location | Dulles Airport ¹ | Reagan National Airport ¹ |
| | | |
| Virginia | \$612.90 | \$205.20 |
| Loudoun County | \$78.40 | \$12.50 |
| District of Columbia | \$378.0 | \$299.1 |
| Maryland | \$208.5 | \$130.1 |
| Total Metropolitan Area | \$1,199.40 | \$634.40 |

¹ Economic Impact for Dulles and Reagan National from MWAA 2012 *Economic Impact Study*

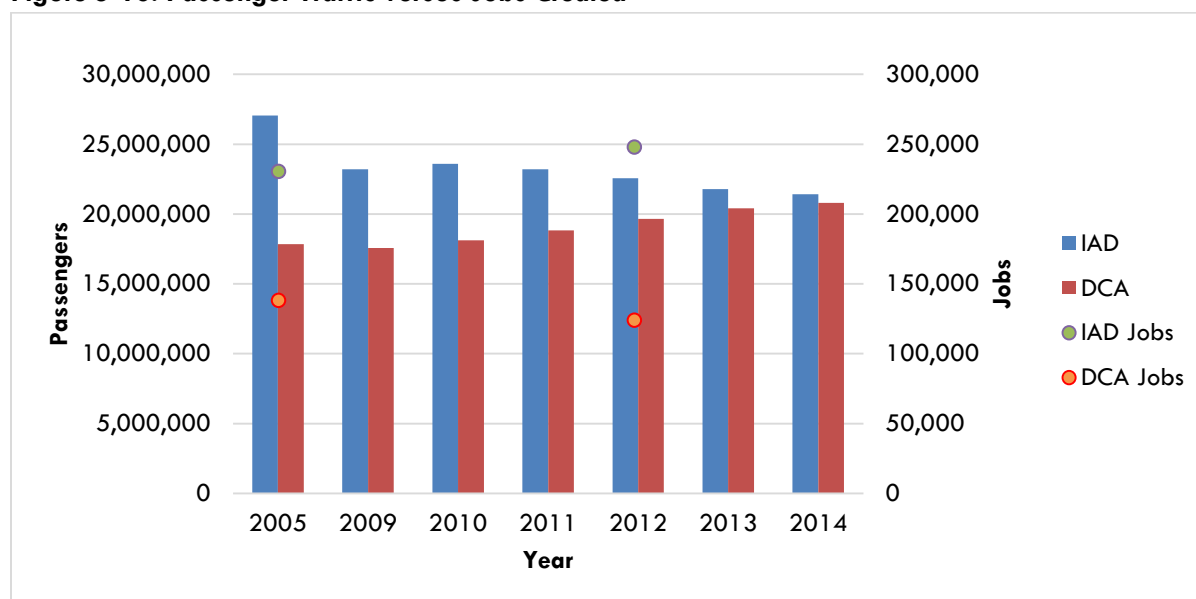
Dulles Airport generated over 247,000 jobs compared to less than 123,000 by Reagan National, and Dulles Airport generated close \$10 billion in labor income and \$1.2 billion in State and Local taxes.

When comparing Dulles Airport and Reagan National, Dulles Airport creates more than two times the jobs in Virginia and the most labor income in the metropolitan study area. Additionally Dulles Airport generates a significant \$78.40 million in state and local taxes in Loudoun County, compared to \$12.5 million generated by Reagan National.

There are few conclusive trends in passenger volume and freight volume and their associated economic impact. The following figures depict total passengers and freight volumes for Dulles Airport and Reagan National Airport in comparison with two different measures of economic impact.

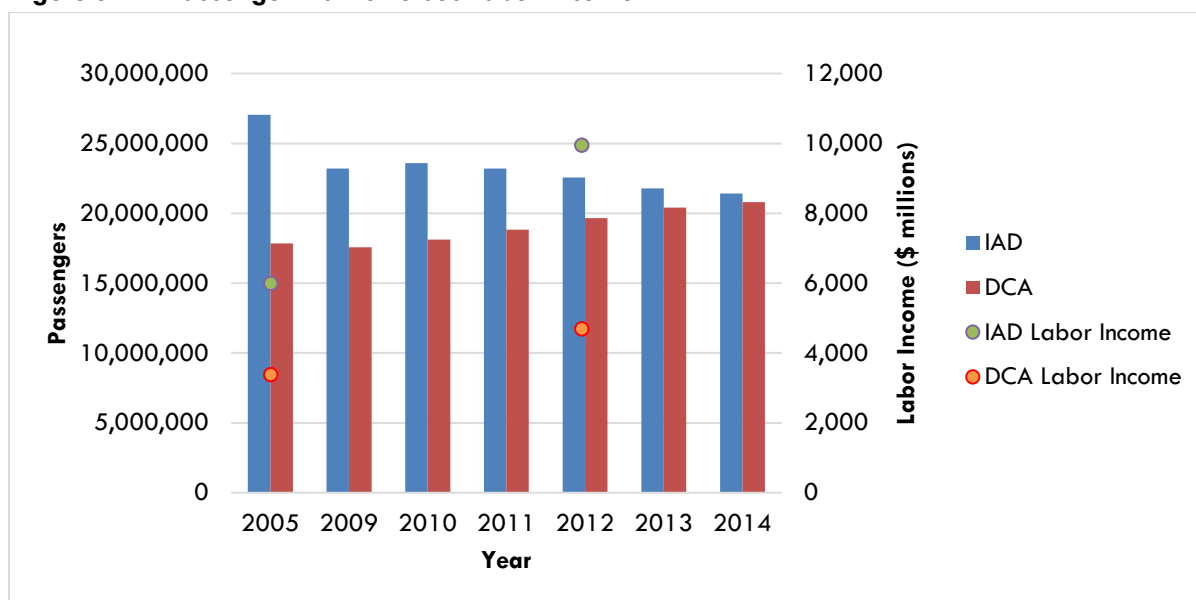
Passengers

Figure 5-10: Passenger Traffic versus Jobs Created



Source: MWAA Air Traffic Statistics 2005-2014 & Economic Impact for Dulles and Reagan National from MWAA 2012 Economic Impact Study

Figure 5-11: Passenger Traffic versus Labor Income

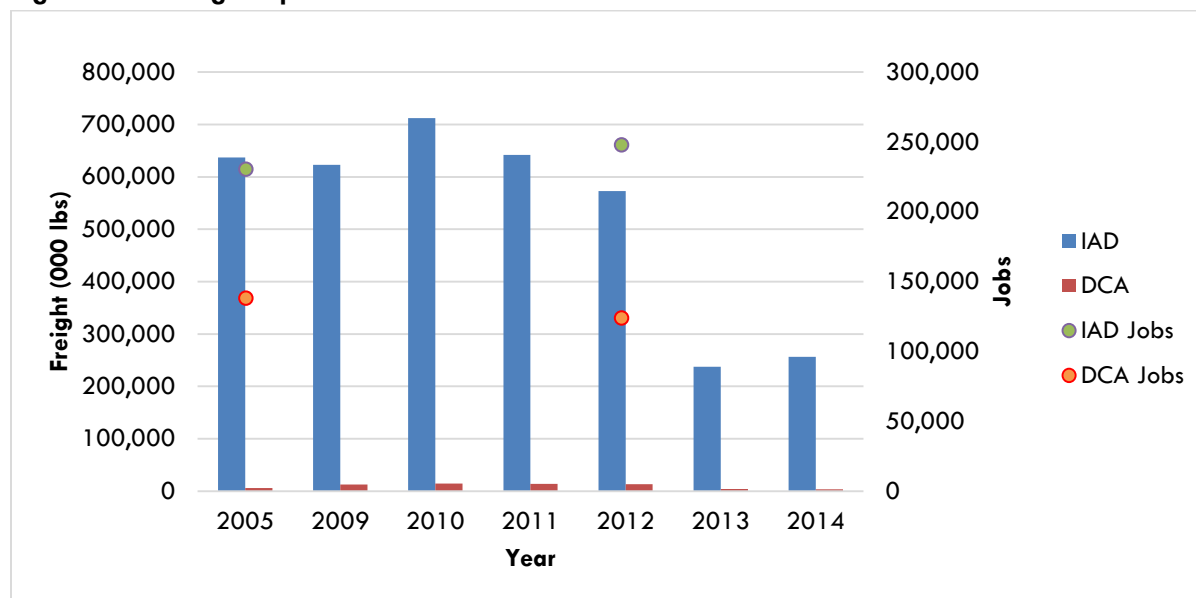


Source: MWAA Air Traffic Statistics 2005-2014 & Economic Impact for Dulles and Reagan National from MWAA 2012 Economic Impact Study

The data displayed above does not suggest any significant correlations between passenger numbers and economic impact. Though Dulles Airport (IAD) has seen a steady decline in total passengers between 2009 and 2014, both economic indicators have increased significantly. Reagan National (DCA) has experienced an increase in total passengers but a less pronounced increase in labor income and showing a decline in jobs created.

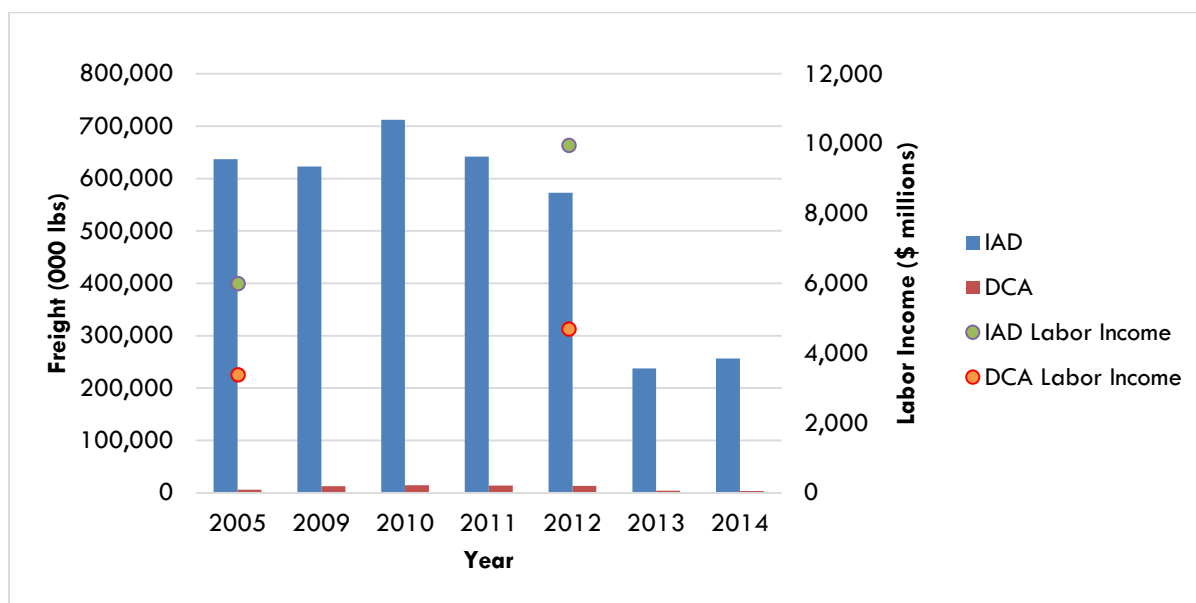
Freight

Figure 5-12: Freight Operations versus Jobs Created



Sources: MWAA Air Traffic Statistics 2005-2014 & Economic Impact for Dulles and Reagan National from MWAA 2012 Economic Impact Study

Figure 5-13: Freight Operations versus Labor Income



Sources: MWAA Air Traffic Statistics 2005-2014 & Economic Impact for Dulles and Reagan National from MWAA 2012 Economic Impact Study

The data displayed above shows no significant correlations between freight operations and economic impacts. Despite having far fewer freight operations than its neighboring airports, Reagan National (DCA) created more jobs and produced higher labor income than BWI in 2005 and 2009. Economic indicators for Dulles Airport (IAD) have improved between 2005 and 2009 despite a net decrease in freight operations. Without economic impact data beyond 2012, it is difficult to determine how the major decline in freight operations at Dulles Airport since 2012 has affected jobs and labor income.

With a general decrease in passengers at Dulles Airport and an increase in passengers at Reagan National, the two airports have served relatively similar numbers of passengers in recent years. However, Dulles Airport still outperformed Reagan National in terms of economic impacts in 2012. Construction of airport facilities is one factor that contributed to this difference. In 2012, \$72.8 million dollars were spent on new airport construction as well as rehabilitation at Dulles Airport, with only \$40.3 million spent at Reagan National. Furthermore, despite similar passenger numbers, Dulles Airport still handled over 40 times as much freight by weight as Reagan National in 2012. Though freight operations have been declining, as of 2012, Dulles Airport still handled 98% of freight operations between the two airports, and with no room to expand, Reagan National will not likely be a competitor in the future. Construction efforts and the capacity for freight operations create additional jobs at Dulles Airport that are not matched at Reagan National.

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