Market Assessment of Life Sciences Laboratory Space in Philadelphia

November 2019

RESGroup
REAL ESTATE SOLUTIONS

CBRE

PIDC
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**RESGroup**
Statement of the Problem

The explosion of biotech and advanced life sciences in Philadelphia has touched off a scramble for lab space, with just 2% vacancy in University City (UCity) and little inventory elsewhere in the City. As companies grow and startups continue to emerge from research powerhouses such as the University of Pennsylvania (UPenn) and Children’s Hospital of Philadelphia (CHOP), the lack of readily available lab space is significant challenge for companies that wish to remain in the City.

The life sciences sector has long been a powerful driver of the regional economy, with 50,000+ jobs and nearly 9 million (M) square feet (SF) of lab, office, and manufacturing space. New advances in cell and gene therapies are accelerating this growth. In December 2017, the U.S. Food and Drug Administration (FDA) awarded Philadelphia-based Spark Therapeutics the first gene therapy approval for Luxturna, a treatment for hereditary retinal disease. Four months later, Novartis received approval for Kymriah, a gene therapy treatment for acute lymphoblastic leukemia that emerged from research at UPenn and CHOP. Philadelphia now features a strong and growing cluster of cell and gene therapy companies, with a diverse array of new therapies under research or in clinical trials.

With nearly $1 billion (B) in National Institutes of Health (NIH) research awards to Philadelphia institutions in 2018¹, cell and gene therapy advances continue at an impressive rate, fueling a robust pipeline of new products. Regional venture capital (VC) investments in 2019 are the highest on record, supporting the next cycle of therapies. Acquisitions by major pharmaceutical companies, such as Roche’s $4.8B acquisition of Spark, will significantly expand the commercial reach of these companies.

What emerging companies need most is quality lab space close to research centers, to access talent, research, and collaboration opportunities. Demand has outstripped supply, however, and companies are making difficult decisions, such as delaying expansion or separating lab and office functions, to remain in UCity as they await new space. Companies outside the region are similarly frustrated with the shortage of options near UCity’s research institutions and talent pool. New supply has lagged as developers grapple with high development costs, finding anchor tenants of sufficient size, and tenant risks.

The City of Philadelphia and Philadelphia Industrial Development Corporation (PIDC) retained Real Estate Solutions Group (RESGroup) and CBRE to assess the lab space market in Greater Philadelphia and recommend strategies to encourage new lab space development in the City.

¹ Source: CBRE
Scope of Work

RESGroup and CBRE executed the following scope of work to understand the space needs of biotech and advanced life science companies, assess supply and demand in Philadelphia and surrounding areas, identify gaps, and recommend strategies to address those gaps and enable the City to retain and capture the future growth of these companies. It is important to note that this dynamic market evolved rapidly during the study, including multiple development announcements and major company investments. These changes illustrate the nature of this emerging market and the potential for future growth of this important industry in the City’s economy if physical space needs can be addressed.

• Space Needs by Stage of Growth
  o Obtained information on the stages of growth for life science companies.
  o Obtained definition of the space needs and preferences by stage of company growth from architectural professionals including: size of space, percentage lab vs. office space, typical number of employees, location preferences, type of building (multi- vs. single-tenant, single-floor vs multi-floor), general fit out and system requirements (wet/dry labs, HVAC, clean rooms, equipment, kitchens/coffee stations).
  o Refined our understanding of these space needs through an online survey of life science companies and stakeholder interviews with research institutions, developers, and life science companies.

• Demand Analysis
  o Conducted an online survey and stakeholder interviews to develop the basis for the Demand Analysis.
    ▪ With feedback from PIDC and the City, an online survey was distributed to an estimated 300 life science companies. The online survey obtained data on company size (square footage and number of employees), anticipated space needs over the short-term, current location, preferred location, required fit out and building amenities, rents, and other pertinent information.
    ▪ Stakeholder interviews were conducted with 13 life science companies, mostly smaller Startup and Mid-Size companies, and 10 institutions and developers. In addition to the subjects addressed in the online survey, stakeholder interviews obtained greater detail on demand trends, and on the challenges and issues life science companies face in the Philadelphia market.
  o A detailed analysis of the online survey and stakeholder interviews is presented as an appendix to this report, with a summary of findings presented in the Demand Analysis section.
• Market Analysis - Existing Supply and Development Pipeline
  o Identified competitive lab submarkets within the larger Philadelphia region (DE to NJ).
  o For each of identified submarkets (Philadelphia – UCity and Philadelphia Suburbs – primarily concentrated along Route 202 Corridor), obtained total square footage, average vacancy rate, the range of rental rates, typical lease structure, TI requirements, and typical lease terms (as available) from the CBRE database as well as interactions with market authorities and participants.
  o Building-by-building detail was obtained for the UCity market for both existing buildings and for the development pipeline. Given the size of the Philadelphia Suburban market, data was collected as available for a sample of buildings.
  o Development pipelines for UCity and the Suburbs were obtained through discussions with market authorities and published sources. Project location, developer, proposed square footage, rental rates, timing of development, and the stage of likely tenants were obtained.

• Conclusions and Recommendations
  o Based on the findings of each of the above tasks, prepared conclusions summarizing existing conditions within the Philadelphia lab space market.
  o Prepared recommendations for the City and PIDC to improve market conditions and address the challenges local life science companies face.

• Report
  o Prepared this report presenting the research, findings, conclusions, and recommendations for the City and PIDC.
Space Needs by Stage of Company Growth

Biotech and advanced life sciences companies move through a sequence of growth phases with different space requirements, based on the stage of research, source of funding, and need for ancillary office and/or manufacturing space. Figure 1 presents a sample life cycle for a biotechnology firm\(^2\), including phase name, major activity, and primary source of funding. Figure 2 shows the relationship between real estate needs and funding type in each phase.

\(^2\) Actual cycles may vary based on therapy type, regulatory requirements, and other factors.
Figure 2 – Real Estate Funding Considerations by Growth Stage

**Startup**
Limited capital. Companies seek affordable space, often incubators, to maximize dollars for R&D.

**Graduate**
Series A funding. More space needed for pre-clinical research. Companies are too big for incubators & too small for commercial space. Affordability still critical to preserve funding for R&D.

**Mid-Size**
Series B funding for Phase I-III clinical trials. Space needs increase significantly, potentially including manufacturing. Commercial space now viable.

**Mature 1.0 - Commercialization**
Series C funding begins with commercialization & revenue. Increased SF for lab, office & potentially manufacturing. Commercial space & stand-alone facility are options.

**Mature 2.0 - Scaling & Expansion**
Revenue and investments support R&D and manufacturing. Significant increases in lab, office, and production to accommodate sales growth and new product R&D, often in a dedicated facility or campus.
Based on feedback from companies, institutions, architects, PIDC, and the City, RESGroup developed a matrix of space requirements for each stage of growth, as shown in Table 1.

**Table 1 – Space Needs by Stage of Growth**

<table>
<thead>
<tr>
<th>Growth Stage</th>
<th>STARTUP →</th>
<th>GRADUATE →</th>
<th>MID-SIZE →</th>
<th>MATURE 1.0 – COMMERCIALIZATION →</th>
<th>MATURE 2.0 – SCALING &amp; EXPANSION →</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Activities</strong></td>
<td>• Provisional patent/licensing</td>
<td>• Basic research/drug discovery</td>
<td>• Clinical Trial Phases I-III</td>
<td>• Clinical result publication</td>
<td>• Post-market clinical studies</td>
</tr>
<tr>
<td></td>
<td>• More lab than office (e.g. 1,000 SF private lab w/ 2-3 benches, 500 SF shared office)</td>
<td>• More lab than office, or equal amounts</td>
<td>• Single floorplate in multi-tenant building</td>
<td>• More office than lab space</td>
<td>• IPO/Potential M&amp;A</td>
</tr>
<tr>
<td></td>
<td>• &lt; 10 employees</td>
<td>• 10-30 employees</td>
<td>• Roughly equal lab &amp; office</td>
<td>• &gt;50 employees</td>
<td></td>
</tr>
<tr>
<td><strong>Space Needs</strong></td>
<td>1,500-2,000 SF</td>
<td>2,000-10,000 SF+</td>
<td>20,000-30,000 SF</td>
<td>&gt; 30,000-100,000 SF+</td>
<td>300,000-550,000 SF</td>
</tr>
<tr>
<td></td>
<td>• Flexible lease terms; month-to-month ideal</td>
<td>• 3-5 years</td>
<td>• 5-10 years</td>
<td>• 7-10 years</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Incubators ideal because they eliminate/minimize fit-out expenses</td>
<td>• 3-5 years</td>
<td>• Capacity to expand or relocate to larger space in building with same lease terms, based on trial results</td>
<td>• Single tenant build-to-suit, or anchor tenant on multiple floors of multitenant building</td>
<td>• 10-15 years</td>
</tr>
<tr>
<td></td>
<td>• Private lab space required, but office can be shared</td>
<td>• No shared equipment</td>
<td>• Single tenant build-to-suit, or anchor tenant on multiple floors of multitenant building</td>
<td>• More office than lab space</td>
<td>• Build-to-suit, multiple floors, or campus style space</td>
</tr>
<tr>
<td></td>
<td>• Shared kitchen, outdoor &amp; networking/event spaces</td>
<td>• Additional benches</td>
<td>• Manufacturing either on site or at a remote location</td>
<td>• &gt;50 employees</td>
<td>• Custom workspace build-out and custom amenities</td>
</tr>
<tr>
<td></td>
<td>• Mtg. rooms for 2-4 people; one for 12-15</td>
<td>• Private lab &amp; office</td>
<td>• Staffing (i.e. regulatory, accounting, legal, human resource functions)</td>
<td>• &gt;50 employees</td>
<td>• Custom workspace build-out and custom amenities</td>
</tr>
<tr>
<td></td>
<td>• Common equipment (e.g. freezer farms, glass wash)</td>
<td>• Ability to expand quickly</td>
<td>• Additional amenities like meeting rooms and kitchens incorporated into tenant space</td>
<td>• Additional amenities (e.g. fitness center)</td>
<td>• Custom build-out</td>
</tr>
<tr>
<td></td>
<td>• Networking space within bldg./neighborhood</td>
<td>• Most amenities in common areas</td>
<td>• Custom build-out</td>
<td>• Custom build-out</td>
<td></td>
</tr>
</tbody>
</table>

Source: PIDC, RESGroup
Demand Analysis

Biotech and life sciences companies are uniquely sensitive to location, as proximity to research and talent are critical to successful commercialization. Through interviews and surveys, RESGroup identified the following top locational requirements:

- Access to a skilled labor pool of scientists and experienced workers;
- Walking distance to research institutions and similar life science firms;
- Excellent access to local and regional mass transit;
- Restaurants, retail, hotels and other amenities to support staff needs and business activities.

UCity was repeatedly identified as the preferred location in RESGroup’s interviews and surveys, followed by Center City, the suburbs, and the Navy Yard. This mirrors CBRE’s anecdotal experience with life science clients. UCity offers close proximity to UPenn and CHOP, national leaders in cell and gene therapy research, as well as the Science Center, the Wistar Institute, and Cambridge Innovation Center/BioLabs (CIC). This concentration of research and expertise yields the deepest life science talent pool in the region, in a highly developed environment that offers restaurants, retail, hotels, and easy access to SEPTA’s regional rail, AMTRAK, and the Philadelphia International Airport.

Factors such as occupancy costs and incentives were also important, but access to scientists and skilled workers was the primary motivation in determining a preferred location.

UCITY ATTRACTING BIOTECH FIRMS FROM BEYOND PHILADELPHIA

The location factors that are so important to local firms are equally attractive to firms outside the City. In 2019 Amicus Therapeutics relocated its gene therapy research from Cranbury, NJ to UCity to take advantage of the deep pool of scientists, other skilled labor, and proximity to research institutions.

Amicus has moved to temporary space in CIC at 3675 Market Street as it awaits fit-out of a permanent space on the top three floors of the same building. Ultimately the company is expected to occupy 75,000 SF and create 200 new jobs.
Proximity, specifically walking distance, to research centers, incubators, life science company clusters, transit, and amenities was repeatedly identified as a primary location factor by companies, most strongly at the Startup to Mid-Size stages of company growth.

To identify the most desirable locations for lab space, RESGroup mapped walkable distances from the current lab cluster at 34th and Market Streets (Map 1). The inner circle on Map 1 shows all locations within a half mile, while the outer ring shows locations within one mile. These distances represent reasonable walking times to the main research cluster and nearby transit stops (stations on the Market-Frankford Line are marked with red dots and trolley stops are indicated with blue dots) to ensure connectivity to other City locations and residential neighborhoods. The half-mile radius indicates the prime location for life science companies within UCity, with the one-mile radius being less attractive but still reasonable.
RESGroup assessed several locations outside UCity as well, to gauge viability. These locations include the Lower Schuylkill innovation district and the Navy Yard. Map 2 illustrates distances from 34th and Market Streets to each of these alternatives.

The Lower Schuylkill Innovation District is just south of UCity and features several riverfront development sites targeted to life science uses. The area is directly connected to UCity by trolley and to UPenn’s Pennovation campus and Center City by the Schuylkill River Trail for pedestrians and cyclists.

The Navy Yard is a 1,000-acre campus in South Philadelphia with an established life science cluster that includes mature biotech companies, contract research organizations (CROs), and contract development and management organizations (CDMOs). The Navy Yard connects to Center City via the Broad Street Line (BSL) subway, as well as a dedicated shuttle service that runs every six minutes. Connection to UCity is available between the BSL and Market Frankford Subway lines.

Although distance from UCity and lack of familiarity with transit options make these areas less attractive as lab space locations for Startup, Graduate, and smaller Mid-Size companies, both are strong options for cell or gene therapy manufacturing facilities and single-user buildings for mature companies. For purposes of lab space, however, this study will focus on UCity.

Biotech and advanced life science companies, particularly those in the Startup, Graduate, and Mid-Size stages of growth, report a severe shortage of lab space in their preferred location of UCity. The shortage is especially acute for incubator and small to medium expansion spaces, according to interviews and the online survey conducted by RESGroup.
Many companies reported considering options outside UCity and/or Philadelphia, however the consensus is that the location advantages of UCity are unique within the region and can’t be found elsewhere. This is consistent with anecdotal reports from CBRE, the City of Philadelphia’s Commerce Department, and PIDC.

Due to the fast-evolving nature of this sector, insufficient historic data exists to accurately predict demand. Instead, RESGroup assembled anecdotal data from multiple sources to illustrate current demand and trends.

Of the 66 firms that participated in the online survey, 22 (mostly Startups and Graduates) are looking to expand and were estimated to immediately need 60,500 SF of lab space. As survey respondents are a fraction of those in the area, the actual need is almost certainly much higher.

After a long period of relative inactivity, over 200,000 SF of lab space was leased in the Philadelphia suburbs in Q2 2019. As the majority of life science companies prefer a UCity location, some of this suburban absorption was likely the result of companies having to settle for a location outside of their preferred area, reflecting lost economic opportunity and jobs for the City.

Finally, statistics tracked by the City of Philadelphia and the Cambridge Innovation Center for 2018 and 2019, and presented in Figures 4 and 5, suggest a continued and increasing need for lab space in UCity. Interest was highest from companies with 10 or fewer employees, likely in the Startup or Graduate stage. Figure 4 shows the increase in interest since 2018.

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3 This absorption does not include the 130,000 SF of leasing activity at the Spring House Innovation Park in Lower Gwynedd, as that statistic also includes non-life science tenants.
Figure 4 – Life Science Companies Entering or Expressing Interest in Philadelphia Market 2018-2019

Source: City of Philadelphia and CIC
Figure 5 – Projects Reported in the City of Philadelphia
Q1 FY 2018 to Q2 FY 2019

Source: City of Philadelphia
Typically, significant and growing demand would generate responsive new development from the private sector. In this case, however, multiple factors constrain development of new lab space. Life science companies are very dynamic, particularly during the Startup, Graduate, and early Mid-Size stages, with rapidly changing space needs that require flexibility, as well as lease terms that are atypical and often unacceptable to landlords and commercial lenders. These and other challenges are summarized in Figure 6 below. Companies in the later Mid-Size and Mature stages do not face the same challenges, as their space needs are more typical and they generally have sufficient financial resources.

Figure 6 – Development Challenges by Stage of Growth

<table>
<thead>
<tr>
<th>Stage</th>
<th>Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Startup</td>
<td>Expensive fit-out, Lower rents, Very small spaces, Flexible lease terms with short duration, Pre-revenue tenants, Limited cash flow, High risk of default</td>
</tr>
<tr>
<td>Graduate</td>
<td>Expensive fit-out, Lower rents, Small spaces, 3-5-year lease terms, Quick expansion capacity required, Pre-revenue tenants, Limited funds for real estate, High risk of default</td>
</tr>
<tr>
<td>Mid-Size</td>
<td>Expensive custom fit-out, 5-10-year lease terms, Expansion capacity required, Pre-revenue tenants, Risk of default</td>
</tr>
</tbody>
</table>

Significantly higher construction and fit-out costs (compared to commercial space) also present a major challenge to developers. Generally per-square-foot (PSF) construction costs for basic wet lab space range from $500-$600 (excluding land), with TIs ranging from $200-$300 PSF. As finish and fit-out quality increase, costs rise accordingly (in some cases approaching $1000 PSF). Already high costs are compounded for Startup and Graduate companies, as small space requirements force developers to divide building floor plates and frequently move demising walls as they expand or switch spaces.

Startup and Graduate companies also struggle to pay premium rents and tenant improvement costs, and/or commit to standard lease terms that are required to support commercial financing of lab development. As a result, most incubator space in UCity is institutional, a small component of a larger project, or perceived as overly expensive.
Existing Supply and Development Pipeline

To understand supply, CBRE evaluated locations in the City, suburbs, and neighboring states with existing or planned inventory capable of satisfying the needs of companies looking for startup or expansion space. UCity and several locations in the Philadelphia suburbs emerged as the strongest options for life science companies in need of lab space.

Delaware and Princeton, NJ were initially considered, but eliminated due to limited available space and/or incompatibility with tenant preferences. The Navy Yard was also excluded, as its cluster is dominated by Mature single-users and CRO/CDMO space.

The following section presents an overview of the Philadelphia regional multi-tenant lab market, including two primary submarkets: UCity and Philadelphia Suburbs (Map 3). As the focal point of this study, detailed building-by-building information (existing and proposed) is presented for the UCity submarket. Given the size of the Philadelphia Suburbs, only summary data is presented for this submarket; building-by-building data is presented for a sample of the properties located in this area. Although there are many available buildings with lab space in the suburbs, they are not concentrated in one location as in UCity.
### Regional Philadelphia Market Overview

<table>
<thead>
<tr>
<th>Submarket</th>
<th>Total SF</th>
<th>Vacancy</th>
<th>Asking Rent PSF (NNN)</th>
<th>Proposed Development SF</th>
</tr>
</thead>
<tbody>
<tr>
<td>UCity</td>
<td>1,732,000</td>
<td>2%</td>
<td><strong>New/Redeveloped</strong> - $45-$55</td>
<td>1,039,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>2nd Generation</strong> - $30-$35</td>
<td></td>
</tr>
<tr>
<td>Philadelphia Suburbs</td>
<td>7,200,000</td>
<td>14%</td>
<td><strong>New/Redeveloped</strong> - $25-$35</td>
<td>140,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>2nd Generation</strong> - $15-$23</td>
<td></td>
</tr>
<tr>
<td><strong>Total Multi-Tenant Inventory</strong></td>
<td><strong>8,932,000</strong></td>
<td><strong>12%</strong></td>
<td></td>
<td><strong>1,179,000</strong></td>
</tr>
<tr>
<td>Navy Yard(^6)</td>
<td>474,400</td>
<td>0%</td>
<td>Not Applicable</td>
<td>136,000</td>
</tr>
</tbody>
</table>

Source: CBRE, PIDC

The Philadelphia regional market for multi-tenant lab space contains nearly 9M SF of space, with an average vacancy of 12%. Space in the Philadelphia suburbs consists mainly of several large-scale former research campuses for major pharmaceutical companies, including the former GSK campus in King of Prussia and the former Rohm and Haas campus in Spring House, Bucks County. Excluding the Navy Yard, which only contains single-tenant buildings, vacancy rates in UCity are the lowest within the region at 2%, illustrating the strength of the demand for space in that neighborhood. As discussed in the prior section, life science companies have a strong preference for this location with its easy access to scientists and skilled workers, local research institutions, other life science companies, and the mass transit network. This proximity is especially important for Startup, Graduate, and Mid-Size companies, which may benefit more significantly by interacting with similar companies.

Vacancy rates are significantly higher in the surrounding suburbs, despite asking rents that range from 35%-45% lower than in UCity, again illustrating the strong market preference for this location. The following charts compare rents for new/redeveloped space and for 2nd generation space (previously occupied by a life science tenant) for the UCity and Suburban submarkets.

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4 Total square feet in multi-tenant buildings for all submarkets except the Navy Yard.

5 Includes only earlier phases of the uCity and Schuylkill Yards developments.

6 Navy Yard buildings are all owner-occupied.
Figure 4 – Rent and Vacancy Comparison, UCity vs. Philadelphia Suburbs

Source: CBRE
University City and Philadelphia

**Market Overview**

While the Greater Philadelphia region has historically seen the majority of life science activity headquartered on suburban campuses, activity over the last several years has started moving from the suburbs into UCity, with demand driven by a deep talent pool, major universities, and acclaimed hospitals. Companies are also inclined to locate near each other, particularly alongside recipients of VC funds and the regulatory approvals necessary to bring products to market. Given its accessibility to the Northeast Corridor and lower costs compared to life science clusters in Boston, New York, and Washington, D.C., UCity has become a very attractive location for these firms.

Historically, UCity’s lack of available funding has hindered regional industry growth. However, from Q1 2017 through Q3 2018, the region experienced growth in VC investment by almost 500%, driven in part by the recent FDA approvals in gene and cell therapies. 2018 was a year of significant momentum, and it is anticipated that increased interest from VC funds will help to spur further activity. Moreover, UPenn recently announced plans to invest up to $50M over the next three years into local life science ventures. Nonetheless, much work remains to attract national investment firms, many of which still view Philadelphia as an emerging market.
Supply Overview

UCity’s multi-tenant lab spaces are clustered on Market Street, between 34th and 38th Streets, as shown in Map 4.

Map 4 – Existing Multi-Tenant Lab Buildings in UCity

Source: CBRE
UCity occupancy is 98% for 1.7M SF of existing space. New space is $45-$55 PSF on a triple net\(^7\) (NNN) basis with a minimum ten-year lease, while 2\(^{nd}\) generation space is $30-$35 PSF NNN. Tenant improvement (TI) allowances of $75-$125 PSF, cover <50% of tenant build-out. TI may be amortized into rent, though smaller tenants do not prefer this option.

\(^7\) Tenant is responsible for all costs above base rent.

### Table 3 – UCity Multi-Tenant Buildings

<table>
<thead>
<tr>
<th>Address</th>
<th>Size (SF)</th>
<th>Vacancy</th>
<th>Primary Tenants</th>
<th>Ownership</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>3508 Market St.</td>
<td>54,000</td>
<td>15%</td>
<td>Monell Chemical Senses Center</td>
<td>Monell Chemical Senses Center</td>
<td>Current 8,300 SF vacancy is office space that could be converted</td>
</tr>
<tr>
<td>3624 Market St.</td>
<td>210,000</td>
<td>10%</td>
<td>UPenn, Excision Bio Therapeutics</td>
<td>Science Center</td>
<td>16,000 SF 2nd generation lab vacancy and 5,000 SF office vacancy</td>
</tr>
<tr>
<td>One Drexel Plaza</td>
<td>280,000</td>
<td>0%</td>
<td>Spark Therapeutics</td>
<td>Brandywine Realty Trust</td>
<td>Redevelopment of Bulletin Building for single tenant; displaced tenants include incubator sublet space</td>
</tr>
<tr>
<td>3440 Market St.</td>
<td>130,000</td>
<td>0%</td>
<td>UPenn, Exponent, CHOP</td>
<td>Science Center</td>
<td>-</td>
</tr>
<tr>
<td>3675 Market St.</td>
<td>350,000</td>
<td>0%</td>
<td>CIC, Amicus, Science Center</td>
<td>Wexford</td>
<td>Includes incubator space</td>
</tr>
<tr>
<td>3700 Market St.</td>
<td>51,000</td>
<td>0%</td>
<td>UPenn, LabCorp</td>
<td>National Board of Medical Examiners</td>
<td>-</td>
</tr>
<tr>
<td>3701 Market St.</td>
<td>168,000</td>
<td>0%</td>
<td>Penn Medicine, Drexel</td>
<td>Science Center</td>
<td>-</td>
</tr>
<tr>
<td>3711 Market St.</td>
<td>155,000</td>
<td>0%</td>
<td>Invisible Sentinel, Avid Radiopharmaceuticals, Integral Molecular, Drexel</td>
<td>Wexford</td>
<td>-</td>
</tr>
<tr>
<td>3737 Market St.</td>
<td>334,000</td>
<td>0%</td>
<td>Spark Therapeutics, Penn Medicine, CHOP</td>
<td>Wexford</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL:</strong></td>
<td><strong>1,732,000</strong></td>
<td><strong>2%</strong></td>
<td></td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

Source: CBRE
3675 Market Street, completed in November of 2018 and anchored by the region’s first Cambridge Innovation Center (CIC) co-working and startup lab space, contains 345,000 SF and was close to 100% committed before it opened (Figure 5). Lab space at the CIC, which is managed by Biolabs, is 100% occupied with a waiting list for future openings. The University City Science Center is also a tenant in the building and provides programming and events for UCity’s entire life science community.

Part of the transformative Schuylkill Yards project, led by Brandywine Realty Trust, is 3001-3025 Market Street (called One Drexel Plaza or by its former name, the Bulletin Building) (Figure 6). It is currently being redeveloped primarily for a single tenant, Spark Therapeutics, which will occupy approximately 108,000 SF of the 250,000 SF building. To accommodate this redevelopment, prior tenants (including life science investment firm Militia Hill Partners and small life science companies) were displaced, creating additional demand pressure in the market.

Although not included in Table 3, a number of companies have found affordable space at the Pennovation Center, a 58,000 SF tech and lab incubator owned by UPenn and managed by 1776. Although this property does accommodate startup life science companies and has lab space, the facility also hosts many tech startups, so it was excluded from our estimate of UCity lab supply. It is also located off the Market Street corridor in the Lower Schuylkill to the south.

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8 Developed by the Science Center, Wexford Science + Technology, and Ventas
UCity Development Pipeline

Developers are proposing 1,039,000 SF of new lab space in UCity over the next 18 to 24 months, with an additional 1,355,000 SF planned over the longer-term (Map 5). While most projects are located in the existing cluster, University Place Associates’ 3.0 and 4.0 buildings will create new opportunities further west at 40th and Market Streets.

Map 5 – UCity Development Pipeline

Source: CBRE
Table 4 details short-term development projects slated for delivery within 24 months, including the portion of each project that will incorporate lab space and the intended size of tenant companies.

**Table 4 – Short-Term UCity Development Pipeline**

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Location/Address</th>
<th>Lab Space (SF)</th>
<th>Timing</th>
<th>Developer</th>
<th>Tenant Segmentation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short Term</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PennovationWorks Expansion - New 73,400 SF Building</td>
<td>Gray's Ferry and S. 34th</td>
<td>35,000</td>
<td>Completion by November 2020</td>
<td>UPenn</td>
<td>Graduate (2,000-10,000 SF, 10-25 employees)</td>
<td>Less than half of building will be lab; open to all companies, not only Pennovation/UPenn affiliates</td>
</tr>
<tr>
<td>3.0 University Place</td>
<td>4101 Market</td>
<td>240,000</td>
<td>Groundbreaking late 2019, completion early 2021</td>
<td>University Place Associates</td>
<td>Startups in incubator; Mid-Size and larger on other floors</td>
<td>Ben Franklin Tech Partners will run 28,000 SF innovation floor; Wistar Institute will also lease space</td>
</tr>
<tr>
<td>One uCity Square</td>
<td>Warren and N. 36th</td>
<td>389,000</td>
<td>Groundbreaking late 2019, completion late 2021</td>
<td>Wexford</td>
<td>Mid-Size and larger</td>
<td>&gt;100,000 SF in LOIs from tenants</td>
</tr>
<tr>
<td>Schuylkill Yards</td>
<td>Market and 31st</td>
<td>250,000</td>
<td>TBD</td>
<td>Brandywine Realty Trust</td>
<td>Mid-Size and larger</td>
<td>Part of 750,000 SF mixed-use building; amount of lab space will vary depending on tenants; 40-50% anchor tenant likely required</td>
</tr>
<tr>
<td>Powelton Yard</td>
<td>32nd between Arch and Cherry</td>
<td>125,000</td>
<td>TBD</td>
<td>Republic Properties/ Nest Stage Med</td>
<td>Mid-Size and larger</td>
<td>JV with SEPTA over their rail yards; will include medical production space and lab.office</td>
</tr>
<tr>
<td><strong>TOTAL SHORT TERM:</strong></td>
<td></td>
<td>1,039,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: CBRE, RESGroup, PIDC
With five projects anticipated to open by late 2021, developers could add over 1M SF of space to the UCity submarket, compared with only 140,000 SF in the Philadelphia suburbs. The long-term development pipeline looks equally robust, with at least 1,355,000 SF of additional space projected across five locations, listed in Table 5.

### Table 5 – Long-Term UCity Development Pipeline

<table>
<thead>
<tr>
<th>Project</th>
<th>Location/Address</th>
<th>Lab Space (SF)</th>
<th>Timing</th>
<th>Developer</th>
<th>Tenant Segmentation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>3400 Market St.</td>
<td>Market and 34th</td>
<td>450,000</td>
<td>TBD</td>
<td>Wexford</td>
<td>Mid-Size and larger</td>
<td>Currently parking lot</td>
</tr>
<tr>
<td>3800 Market St.</td>
<td>Market and 38th</td>
<td>750,000</td>
<td>TBD</td>
<td>Wexford</td>
<td>Mid-Size and larger</td>
<td>Currently parking lot</td>
</tr>
<tr>
<td>Other uCity Square Buildings</td>
<td>Site bounded by Lancaster, Market, 36th, and 37th</td>
<td>TBD</td>
<td>TBD</td>
<td>Wexford</td>
<td>Mid-Size and larger</td>
<td>Currently parking lot and staging area; could include office, lab, residential, retail, and shared public space</td>
</tr>
<tr>
<td>4.0 University Place</td>
<td>4055-4099 Market</td>
<td>155,000</td>
<td>TBD</td>
<td>University Place Associates</td>
<td>Mid-Size and larger</td>
<td>Site includes Rite-Aid drug store whose lease expires in 2 years</td>
</tr>
<tr>
<td>Schuylkill Yards</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>Brandywine Realty Trust</td>
<td>Mid-Size and larger</td>
<td>Currently parking and low-rise commercial buildings; could include 6M SF of office, lab, residential, retail, hotel, and green space</td>
</tr>
</tbody>
</table>

**TOTAL LONG TERM:** 1,355,000

Source: CBRE, RESGroup, PIDC
Spotlight – Planned Life Science Campuses

Several UCity developers are notable for planning integrated life science campuses with multiple buildings to support lab and office space, as well as retail and residential uses. The most established company in this submarket is Wexford Science + Technology (Wexford), a well-known life sciences developer that has successfully developed three ground-up projects at 3675, 3711, and 3737 Market Street in partnership with the University City Science Center (UCSC) and Ventas.

The joint venture’s uCity Square initiative envisions an integrated campus of 10 dedicated life sciences buildings totaling 4M SF in office and lab space, in addition to supporting new residential uses. The development, illustrated in Figure 7, will be built over the next 10 to 12 years.

Wexford, UCSC, and Ventas are also developing One uCity, which will comprise 389,000 SF of lab and office along with residential. With a groundbreaking planned for late 2019, One uCity will have floor plates ranging from 30,000-35,000 SF to allow for greater flexibility. Altogether, these buildings are expected to cater to a range of user categories from Startup to Mature and encourage companies at different stages to co-locate. For example, 3675 Market is currently home to Amicus Therapeutics, a major tenant occupying 75,000 SF, along with incubators including CIC and Biolabs.
Increased demand has spurred interest from two other developers active in this market as well: University Place Associates (UPA) and Brandywine Realty Trust. UPA’s proposed “3.0 University Place” building at 4101 Market Street will provide 240,000 SF of lab and office space, specifically targeting biotech and advanced life science companies (Figure 8). The 3.0 building has an estimated delivery in Q1 2021 and is envisioned as the first phase of a multi-phase project.

![Figure 8 – 3.0 University Place – University Place Associates](image)

Source: The Sheward Partnership

In many ways, this project is the most responsive to the needs of Philadelphia’s burgeoning biotech and advanced life sciences sector. It will feature a 28,500 SF incubator operated by Ben Franklin Technology Partners, in addition to dedicating a 28,500 SF floor to pre-built 5,000-10,000 SF “Growth Pods” with 3- to 5-year leases for Graduate/smaller-scale companies. While this strategy reflects the strong market demand from Graduate stage tenants, UPA anticipates renting these finished spaces out at relatively high rents, and as such will accommodate only the better funded companies.
Brandywine Realty Trust (BRT), a well-established developer in the Philadelphia region, is deeply engaged in the planning and development of Schuylkill Yards, a 6.9M SF project encompassing 10 sites on Market Street and JFK Boulevard between 30th and 32nd Streets (Figure 9). The first two new buildings proposed will be located along JFK Boulevard with openings planned for 2023. The mixed-use properties are anticipated to contain lab, office, retail, and potentially residential space, and will target larger Mid-Size and Mature life science companies. It should be noted that the timing and mix of uses for this project remains speculative.
While not a dedicated life science campus, UPenn’s Pennovation campus has become a valuable and increasingly important asset for emerging life science companies. Several Startup and Graduate companies have found affordable lab space at the 58,000 SF Pennovation Center at 34th Street and Grays Ferry Avenue, to the south of UCity’s lab cluster (Figure 10). Anecdotally, rents at the Pennovation Center are reported to be significantly less expensive than similar spaces in UCity’s primary cluster, reflecting the moderating role of institutional investment.

The Pennovation Center was excluded from the supply analysis because it is not a dedicated life science facility. However, UPenn’s B-227 lab project at the Pennovation campus is expected to serve primarily biotech and advanced life science companies. The B-227 project will feature 35,000 SF of lab space specifically for Graduate companies. A redevelopment of an existing structure with an institutional owner, this project will be able to offer the lower rents and the lease flexibility that these companies require. UPenn anticipates that this space, slated for completion in Fall 2020, will be fully leased prior to opening.
Timing of New Space Deliveries

At best, new lab space will be ready for occupancy in 18 to 24 months, due to the need to obtain leasing and financing commitments, as well as timing of construction. This does not address the current supply shortage, which is forcing many existing companies to scramble for sites to accommodate their growth. These businesses are resorting to moving to suburban locations, retrofitting spaces that were not built for lab use, spreading out over multiple locations, and squeezing into smaller spaces.

Of particular note, the lack of space means companies from outside the market are also forced to consider other cities, a location in the Philadelphia suburbs, or put their searches in Philadelphia on hold. There is demand for space from tenants of all sizes in this market, with the main draw being proximity to research centers, other life science companies receiving VC funds and FDA approvals, and the local talent pool at a price point well below the Boston, San Francisco, or New York markets.

The lack of space for Startup and Graduate companies that want to locate near their peers is particularly acute, especially with the 2018 closing of UCSC’s incubator and dislocation of companies from One Drexel Plaza. The only spaces proposed for these smaller companies are Benjamin Franklin Technology Partners’ (BFTP) 28,500 SF Startup incubator and Graduate/Pre-Clinical stage Growth Pods at 3.0 University Place, as well as Pennovation’s 35,000 SF B-227 Labs for Graduate and Pre-Clinical companies. These developments comprise only 9% of the 1,039,000 SF proposed in the short-term.

For the purposes of this study, planned long-term developments are considered speculative and do not have a meaningful impact on foreseeable market conditions.
Supply Side Challenges

While significant new development is planned in UCity, the uncertainty and timing of these projects are significant obstacles for the local life science ecosystem. Developers typically cannot obtain financing for new construction before they procure an anchor tenant who would occupy at least 40% of a building or have a similar volume of commitments from Mid-Size tenants. This difficulty delays ground breaking dates, with Mature companies determining when projects begin construction.

Further, most private developers (with the exception of UPA) will typically not accommodate anything smaller than Mid-Size companies that can occupy a single building floor (generally 20,000 to 30,000 SF). Developers will not consider these smaller tenants (Startups, Graduates, smaller Mid-Size), as it requires adding public corridors and demising walls, reducing rentable square footage, revenues, and building values. Companies in these stages also present elevated risk of default until they achieve success in clinical trials, require more flexible terms, and have a more difficult time supporting the requisite rental rates.

Together, these factors delay the start of major projects that will support larger Mid-Size and Mature companies. They also discourage the inclusion of Startup, Graduate, and smaller Mid-Size spaces in most of the larger projects coming online. The overall result is significant market compression for all but the largest companies and a perilous gap in supply for at least 18 to 24 months.

Sustained Tight Supply in UCity is Impacting Company Location Decisions

The factors noted above and the impending 18- to 24-month supply gap may account for some of the recent 200,000 SF absorption of lab/office space in the Philadelphia suburbs, after an extended period of minimal activity. According to CBRE, this leasing activity included tenants ranging in size from 10,000-90,000 SF, including a European company first entering the regional market. An additional 130,000 SF of leasing has occurred at Spring House Innovation Park, the former Rohm & Haas campus in Lower Gwynedd. Although not all tenants are life science companies, the majority are from this sector. Tenants range from 730-25,000 SF, paying rents from $16-$42 PSF. New suburban inventory, such as Discovery Labs, is providing attractive options for companies in critical need of expansion space. It is likely that some of these companies, potentially a significant portion, were unable to find space in UCity and could not wait 18 to 24 months for new space to come online. Given that most life science companies highly prefer a UCity location, these potential new jobs are being “lost” to the suburbs due to a space shortage in UCity.
Philadelphia Outside of University City

Suitable lab space for biotech and advanced life science companies within Philadelphia, but outside of UCity, is limited and largely scattered due to the significant expense associated with converting an existing building to life science lab space or undertaking ground-up construction. To successfully convert an existing building to life science lab use, it must have sufficient systems infrastructure and dimensions to accommodate increased HVAC, water, electric, and exhaust loads. Significant capital investment by the building owner is then required to upgrade those spaces with the necessary infrastructure and to accommodate modern lab uses.

Center City has two lab locations, including a 6,000 SF lab space at 217 S. 24th Street and a 3,150 SF lab that was recently built out for Group K Diagnostics at 1015 Chestnut Street (Figure 11). Group K plans to expand within the space over time; however, additional fit-out will be required, as the building’s remaining space is not currently configured for labs.

A 107,000 SF facility at 3775 Kensington Avenue in Kensington is also available (Figure 12). This former pharmaceutical facility offers quality lab space but has had a difficult time attracting tenants due to its remoteness from UCity research institutions and location in a transitional neighborhood without an established life science cluster.

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9 The Group K conversion is relatively unique, as fit-out requirements for diagnostic firms are less intensive and expensive than those required for biotech firms.

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RESGroup
The 1500 Spring Garden development at 15th and Spring Garden Streets has recently emerged as another lab location outside of UCity (Figure 13). Marketing to life science companies with the promise of tailored upgrades to accommodate their specific needs, the building owner will not refit or subdivide the space without a signed lease. Building representatives indicate that they may convert an entire floor of 100,000 SF to lab space within the next 6 to 12 months, but no formal announcements have been made. While the building is outside UCity and not located within a life science cluster, it offers an attractive, high-quality site with transit connectivity to Center City and UCity.

Map 6 provides the respective locations of the properties discussed relative to UCity.
The Navy Yard

Unlike the scattered sites in Center City, Kensington, and Spring Garden, the Navy Yard offers an established life science cluster featuring a traditional and cutting-edge companies such as GSK, WuXi Apptec, and Adaptimmune. The campus includes nearly 500,000 SF of single-tenant buildings with lab space, and Iovance Biotherapies recently announced plans to build an additional 136,000 SF facility to house lab and production space for its cell therapy. The Navy Yard is well-suited for mature companies that are capable of funding and constructing a dedicated, single-user facility, as well as CRO/CDMO companies that require large footprint sites to develop, produce, and test therapies for third parties.

Table 6 – Navy Yard Existing (Single-Tenant) Buildings

<table>
<thead>
<tr>
<th>Address</th>
<th>Size (SF)</th>
<th>Vacancy</th>
<th>Tenant</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>351 Rouse Blvd.</td>
<td>47,400</td>
<td>0%</td>
<td>Adaptimmune</td>
<td>Includes 35,400 SF office and 12,000 SF manufacturing/production/lab</td>
</tr>
<tr>
<td>4751 League Island Blvd.</td>
<td>82,000</td>
<td>0%</td>
<td>WuXi - LI1</td>
<td>Includes 17,000 SF office, 52,000 SF manufacturing/production/lab, and 13,000 SF support space</td>
</tr>
<tr>
<td>4000 S. 26th St.</td>
<td>55,000</td>
<td>0%</td>
<td>WuXi - CC3</td>
<td>Includes 5,000 SF office, 19,000 SF manufacturing/production/lab, and 23,000 SF support space</td>
</tr>
<tr>
<td>4701 League Island Blvd.</td>
<td>150,000</td>
<td>0%</td>
<td>WuXi - LI2</td>
<td>Includes 26,000 SF office, 112,000 SF manufacturing/production/lab, and 28,000 SF support space</td>
</tr>
<tr>
<td>400 Rouse Blvd.</td>
<td>140,000</td>
<td>0%</td>
<td>WuXi - R400</td>
<td>Includes 13,000 SF office, 16,000 SF manufacturing/production/lab, and 20,000 SF support space</td>
</tr>
<tr>
<td>TOTAL:</td>
<td>474,400</td>
<td>0%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: PIDC
While these buildings are not multi-tenant properties like the others identified in this report, they do illustrate the desirability of Philadelphia as a location for Mature life science companies in the Scaling and Expansion stage, and an opportunity to attract additional companies to the Navy Yard location.

A new project for the California based cell therapy research company, Iovance, is planned at the Navy Yard, and is anticipated to open in mid-2022 as detailed in the following table.

Table 7 – Navy Yard Development Pipeline

<table>
<thead>
<tr>
<th>Project</th>
<th>Location/Address</th>
<th>Lab Space (SF)</th>
<th>Timing</th>
<th>Developer</th>
<th>Tenant</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iovance</td>
<td>300 Rouse Blvd.</td>
<td>136,000</td>
<td>Mid-2022</td>
<td>Gattuso Development Partners</td>
<td>Owner-occupied by Scaling &amp; Expanding Company</td>
<td>$75M project with 35,000 SF office, 89,000 SF lab/production/manufacturing space (meeting FDA guidelines), and 12,000 SF support space</td>
</tr>
<tr>
<td>TOTAL:</td>
<td></td>
<td>136,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: PIDC
Philadelphia Suburbs

The Philadelphia Suburbs contain approximately 7.2M SF of lab space according to CBRE, with the majority concentrated in the 202 Corridor (including the Route 309 corridor), as shown in Map 7.

*Map 7 – Existing Multi-Tenant Lab Buildings in Philadelphia Suburbs*
The overall suburban vacancy rate for multi-tenant lab space is 12%, with most leased NNN. Asking rents are $25-$35 PSF for new construction/redevelopment, with asking rents for 2nd generation space ranging from $18-$23 PSF. A typical TI allowance is $15-$30 PSF, and the remainder can be amortized into the rental rate.

Asking rents are 35%-45% below those in UCity, reflecting UCity’s status as the preferred location for life science companies. Despite this cost advantage, the Suburbs have a vacancy rate 10 percentage points higher than in the UCity submarket.

Suburban absorption in Q2 2019 exceeded 200,000 SF, including a range of leases from 753-93,000 SF. Companies ranged from Startup to Mature and included a European-based life science firm. This large absorption, after an extended period of inactivity, suggests that tenants who may have preferred a UCity location may have settled for a location outside of the City. This could potentially represent lost jobs for Philadelphia, and the losses could be compounded if a large enough concentration of companies is established in a single suburban location. Given the size of some of the redevelopment opportunities in the suburbs, such as Discovery Labs, and the 18- to 24-month horizon for development in UCity, there is the potential for more of this to occur. This absorption, given market preferences for a UCity location, likely reflects a lost opportunity for the City to further increase their life science employment.

The following describes existing and proposed supply in two key sub-markets – the Route 202 Corridor and surrounding suburbs.

**Route 202 Corridor**

**Market Overview**

The Route 202 Corridor sub-market spans Chester County and Montgomery Country and encompasses areas such as Exton, Malvern, King of Prussia, Plymouth Meeting, Ambler, Blue Bell, Springhouse, Lower Gwynedd, and Wayne. The Corridor is home to several of the region’s largest pharmaceutical companies including Teva Pharmaceuticals, GSK, Globus Medical, Pfizer, and Merck. Recent transactions include Charles River Labs expansion into a 73,000 SF space in Wayne, PA.
The significant growth experienced by the City of Philadelphia in life sciences over the last several years has not been mirrored in the suburban submarkets until very recently. Major declines in R&D employment occurred in Montgomery and Chester counties between 2007 and 2014. Between 2001 and 2016, the region (mostly in suburban Montgomery and Chester Counties) lost almost 1/3 of its drug manufacturing employment to out-of-state locations. During the same period, the City of Philadelphia experienced a slow but steady increase in these jobs, culminating in a major surge between 2015 and 2016.

**Sample Buildings in the Route 202 Corridor**

Supply is readily available in this submarket, with multiple sub-lease and direct deal opportunities totaling over 1M SF.\(^{10}\) New construction is not common, as existing former pharmaceutical research space is plentiful and the demand for new space has been limited until recently. Almost all new space introduced to the market is in the form of renovated buildings.

The demand and lack of supply seen in UCity is not reflected in the Route 202 Corridor. Many of the small- to medium-sized companies moving to or considering suburban locations are doing so as a secondary option, due to the lack of options in UCity (in addition to mature workforce/experienced labor-force, business tax burden, and cost of real estate). Large traditional companies, such as Merck or Teva, are more commonly found in the suburbs, as they prefer the lower prices and available land for larger corporate campuses.

At the same time, some of the larger companies are choosing to locate their research labs in UCity while keeping their larger corporate offices in the suburbs due to corporate employee location preferences and tax considerations. Proximity to transit to UCity allows this location to be efficient for commuting and coordination.

Table 8 presents a sample of buildings in the Route 202 Corridor, which also includes the East Norriton/Route 309 area.

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\(^{10}\) Does not include office space where landlords could consider lab deals.
**Table 8 – Route 202 Corridor – Sample of Multi-Tenant Lab Properties**

<table>
<thead>
<tr>
<th>Address</th>
<th>Size (SF)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSK Discovery Labs, King of Prussia, Rte 202</td>
<td>950,000</td>
<td>Former GSK campus being converted into multi-tenant complex; currently 100% vacant</td>
</tr>
<tr>
<td>3000 Horizon Drive, King of Prussia, Rte 202</td>
<td>47,000</td>
<td>13,000 SF leased Q2 2019</td>
</tr>
<tr>
<td>3500 Horizon Drive, King of Prussia, Rte 202</td>
<td>67,000</td>
<td>30,000 SF leased Q2 2019</td>
</tr>
<tr>
<td>466 Devon Park Drive, King of Prussia, Rte 202</td>
<td>155,000</td>
<td>58,000 SF available; will not lease to tenants &lt;30,000 SF</td>
</tr>
<tr>
<td>15-25 Great Valley Pkwy, Malverne, Rte 202</td>
<td>103,000</td>
<td>Recently purchased by Exeter, then fully leased to 2 tenants (10,000 SF and 93,000 SF) during Q2 2019</td>
</tr>
<tr>
<td>405 Eagleville Blvd, Exton, Rte 202</td>
<td>86,500</td>
<td>17,500 SF available via sublease</td>
</tr>
<tr>
<td>700 Pennsylvania Ave, Exton, Rte 202</td>
<td>80,000</td>
<td>10,000 SF leased Q2 2019</td>
</tr>
<tr>
<td>335 Phoenixville Pike, Malverne, Rte 202</td>
<td>105,000</td>
<td>40,000 SF leased Q2 2019 to European company</td>
</tr>
<tr>
<td>Spring House Innovation Park (Former Rohm &amp; Haas Campus), E. Norriton, Rte 202/309</td>
<td>250,000</td>
<td>130,000 SF recently leased; tenants primarily life science companies ranging from Startup to Mid-Size and occupying 730-25,000 SF; rents $16-$42 PSF</td>
</tr>
<tr>
<td>Protecs Innovation Center, Rte 202 Plymouth Meeting</td>
<td>44,000</td>
<td>Includes some incubator space but also traditional tenants; 7,300 SF available</td>
</tr>
<tr>
<td>Protecs Innovation Center, King of Prussia, Rte 202</td>
<td>21,810</td>
<td>Includes some incubator space but also traditional tenants</td>
</tr>
<tr>
<td>Innovation Center at Eagleville, Exton, Rte 202</td>
<td>40,831</td>
<td>Incubator space; 6 suites totaling 6,000 SF available</td>
</tr>
<tr>
<td><strong>TOTAL:</strong></td>
<td><strong>1,950,141</strong></td>
<td></td>
</tr>
</tbody>
</table>

Source: CBRE

The above sample of major buildings includes nearly 2M SF of space, or approximately 27% of the total suburban lab market. The largest property, GSK Discovery Labs, will convert GSK’s former campus in King of Prussia into a multi-tenant complex (Figure 14).
Development Pipeline

Given the higher availability of existing space in the Route 202 area, few new construction projects are proposed. One exception is the 90,000 SF Protecs facility in King of Prussia that seeks to attract Mature companies with a mix of Graduate and/or Mid-Size companies to fill out the space. Table 9 provides further details of the planned facility.

Table 9 – Route 202 Corridor – Development Pipeline

<table>
<thead>
<tr>
<th>Project</th>
<th>Location/Address</th>
<th>Lab Space (SF)</th>
<th>Timing</th>
<th>Tenant Segmentation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protecs Build-to-Suit</td>
<td>3700 Horizon Drive</td>
<td>90,000</td>
<td>Fall 2020</td>
<td>Mature with Graduate and/or Mid-Size in remaining space</td>
<td>Multi-tenant building proposed on excess land</td>
</tr>
<tr>
<td>Total:</td>
<td></td>
<td>90,000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: CBRE

Suburban Market Outside the Route 202 Corridor

Market Overview

Suburban locations outside of the Route 202 Corridor offer limited options for multi-tenant lab space, as the bulk of this activity has trended toward the Corridor’s western suburbs. Notable exceptions include the Pennsylvania (PA) Biotech Center in Doylestown, a 62,000 SF startup incubator and graduate space that is currently planning a 50,000 SF expansion.

Sample Buildings

Table 10 details the multi-tenant lab space options for the “Other Suburban Locations” submarket, totaling 366,000 SF.
**Table 10 – Other Suburban Locations – Existing Supply**

<table>
<thead>
<tr>
<th>Property</th>
<th>Size (SF)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge Business Center, Bristol</td>
<td>300,000</td>
<td>4-building, multi-tenant park with some buildings requiring significant investment; includes excess land for build-to-suit opportunity</td>
</tr>
<tr>
<td>Pennsylvania Biotech Center, Doylestown</td>
<td>62,000</td>
<td>Incubator for Startups and Graduates; planned expansion (see below)</td>
</tr>
<tr>
<td>301 Camars Drive, Warminster</td>
<td>4,000</td>
<td>Multi-tenant building, 100% vacant</td>
</tr>
<tr>
<td><strong>TOTAL:</strong></td>
<td><strong>366,000</strong></td>
<td></td>
</tr>
</tbody>
</table>

Source: CBRE

**Development Pipeline**

The 50,000 SF expansion of the PA Biotech Center, detailed in Table 11, is the only new development planned for this submarket.

**Table 11 – Other Suburban Locations Development Pipeline**

<table>
<thead>
<tr>
<th>Project</th>
<th>Location/Address</th>
<th>Lab Space (SF)</th>
<th>Timing</th>
<th>Tenant Segmentation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pennsylvania Biotech Center</td>
<td>Doylestown</td>
<td>50,000</td>
<td>TBD (potentially 2020)</td>
<td>Startups and Graduates</td>
<td>Expansion of the existing 62,000 SF Biotech Center</td>
</tr>
<tr>
<td><strong>TOTAL:</strong></td>
<td></td>
<td><strong>50,000</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: CBRE

The earliest this project would enter the market would be late 2020, although a later opening is more likely.
Conclusions

Conclusion #1 – Immediate Need for Lab Space in UCity

There is an immediate need for multi-tenant lab space in UCity, as evidenced by the near-zero vacancy rate, incubator waitlists, and feedback from companies, brokers, and stakeholders. This has forced companies to resort to ad hoc, inefficient strategies to remain in UCity. Some have split lab and office into two locations as a temporary solution, while others have delayed expansion until new space comes on the market. Some are considering the suburbs because they see no space becoming available in the next 18 to 24 months, while others may have already relocated to the 200,000 SF leased in the suburbs in Q2 2019.

This shortage is particularly problematic for Startups and Graduates, which are more price-sensitive, require highly flexible lease terms, and will not be accommodated by most new development. Some of these companies may have Series A funding and face pressure to advance their research to the next phase, forcing them to make a hard choice about remaining constrained in UCity, relocating to the suburbs, or leaving the state. The vast majority of the 66 online survey respondents indicated that their companies will need to find new space within a projected two-year timeframe.

While Pennovation’s B-227 project and 3.0 University Place’s incubator and Growth Pods will provide some relief, RESGroup anticipates that demand will outstrip supply for at least 18 to 24 months and likely longer. The online survey identified an immediate need for over 60,000 SF from just 48 Startup to Mid-Size companies, representing a fraction of the sector in Philadelphia and only a portion of the actual demand. Accurately projecting this demand is complicated by the lack of historic data and comprehensive market statistics; however, consistent supply shortages over multiple years, coupled with robust R&D commercialization programs, indicate a sustained level of demand. The limited amount of new supply that comes on the market (e.g. CIC/BioLabs, Pennovation B-227) is filled almost immediately.

Figure 15 shows the categories of life science companies targeted for each of UCity’s planned short-term developments, assuming adequate improvements, amenities, and price.
This strong demand is in large part being created by the cutting-edge research at UCity institutions, which generate Startups and grow Graduates and Mid-Size companies. Demand is also a result of acquisitions by large pharma and biotech entities or investors.

The lack of lab space also prevents companies from outside the region from establishing a Philadelphia presence. While inhibiting the local companies’ growth is problematic, preventing outside companies, especially international firms looking for a foothold in the U.S., from opening local facilities compounds the loss of potential life science jobs.

**Conclusion #2 – General Conditions Constraining the Development of Multi-Tenant Lab Space for All Companies**

Several factors impede the development of multi-tenant lab space in UCity for all user categories:

- **Base Building Cost** – The cost to develop new, ground-up multi-tenant lab space is estimated at $500-$600 PSF, requiring an anchor tenant of 40%-50% of total SF to obtain financing. However, converting an existing building to multi-tenant lab space may better accommodate smaller tenants, as per-square-foot costs would likely result in a lower cost basis. With both cases, much of the cost is associated with upgraded and redundant systems that are essential for safe and efficient lab operations. These costs far exceed those of typical commercial projects.
• **Tenant Fit-Out Cost** – Biotech and advanced life science firms require significant fit-out to accommodate the specialized, regulated nature of their work. These costs are estimated at $200-$300 PSF, far exceeding the $75-$150 PSF typically encountered in commercial leasing, depending upon base building improvements and TIs. Tenants in the Startup, Graduate, and smaller Mid-Size categories typically need assistance to afford fit-out costs, which surpass the TI allowance from landlords and developers.

### Conclusion #3 – Tenant Financing Capacity and Risk Constrain Development of Multi-Tenant Lab Space

In addition to elevated base building and tenant fit-out costs, the following conditions complicate development of multi-tenant lab space for Startups, Graduates, and smaller Mid-Size companies.

- **Tenant Financial Capacity** – Startup and Graduate companies seek affordable rents due to limited financial resources and cash flow at these stages. These companies prefer to focus their resources on research to advance to the next stage of growth rather than investing them in real estate. Even smaller Mid-Size companies encounter pressure from investors to minimize real estate expenditures and channel as many resources as possible into research and product advancement. Basic investments like fit-out and FF&E\(^1\) present capacity and cash flow challenges for these users.

- **Tenant Credit Issues** – Startup, Graduate, and smaller Mid-Size companies are generally pre-revenue, presenting a creditworthiness issue that creates significant risk for developers.

- **Tenant Default Risk** – Startup and Graduate companies present a high risk of lease default with many companies not advancing to clinical trials, resulting in lease default and company dissolution. This amplifies risk for the developer beyond standard commercial development and leasing. In addition to lost revenue, developers may be required to incur additional costs to reconfigure space for new tenants with space needs associated with the Startup and Graduate categories. Developers often cite the emerging nature of this sector, uncertainty regarding the depth of demand, and whether they will be able to fill space and reuse improvements after a default. Although the concern of finding a new tenant is minimized given current unmet demand, it will remain a developer and investor risk until the market is more established.

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\(^1\) Furniture, Fixtures and Equipment
• **Reduced Rentable Square Footage** - Smaller tenants result in a higher ratio of non-rentable areas such as additional public corridors, demising walls and shared amenity spaces, therefore reducing developer revenues and building values. Further, while a building’s rentable areas with smaller tenants decreases, construction costs remain as high (or higher), providing additional negative pressure on building economics. As a result, Startup and Graduate spaces have largely been limited to incubators within institutional projects (e.g. Pennovation Center, Pennovation B-227), incorporated as a small component of a larger project (e.g. 3.0 University Place), or created as a hybrid (e.g. Cambridge Innovation Center in the Science Center/Wexford uCity Square development at 3675 Market).

As a result of these four conditions, most private developers will typically not accommodate anything less than Mid-Size companies that can occupy a single building floor (generally 20,000-30,000 SF).

**Conclusion #4 – Commercial Financing Requirements Restrict Development of Multi-Tenant Lab Space**

Philadelphia is an emerging location for advanced life sciences, resulting in uncertainty about the depth of market demand and significantly fewer large companies than more mature markets such as Boston. As a result, Philadelphia does not yet have a significant number of local companies of the size required to act as an anchor tenant and induce new construction at one of the proposed developments. Developers typically cannot obtain financing for new construction before they procure an anchor tenant to occupy at least 40%-50% of a building or obtain a similar volume of commitments from Mid-Size tenants (each capable of leasing at least one full floor). Projects like One uCity Square and the first new Schuylkill Yards buildings have been diligently pursuing larger tenant commitments to facilitate groundbreaking in late 2019 or early 2020. Even if anchor tenants were procured immediately for these projects, smaller Mid-Size tenants would have to postpone their expansion plans for the estimated 24-month construction period before any new lab space becomes available.

Delays in obtaining anchor tenants also impacts projects with incubators like 3.0 University Place that are designed for Startups and Graduate companies. Initially intending to begin construction in December 2018, UPA pushed back the development’s groundbreaking in hopes of identifying anchor tenants. UPA more recently indicated it would begin construction before 2020 but has yet to announce a date, forcing smaller prospective tenants to seek temporary space solutions in the interim. This uncertainty is incompatible with the rapid growth and dynamic space needs of Startup and Graduate phase companies.
Conclusion #5 – Risks of Insufficient Lab Space in Philadelphia

A vital life science community depends on a concentration of similar companies within a geographic area. Competition from the Philadelphia suburbs and other states, especially where a sizeable talent pool and lab space are more readily available, is increasing and may become more aggressive if the economy begins to soften. Based on CBRE’s 2019 study of the top 20 cities for life sciences, Philadelphia ranks 6th in terms of the number and quality of talent, which is a compelling reason for companies to locate here. If space is not available, however, companies will eventually succumb to pressure from investors and their own executive teams to relocate to a place with adequate space. In particular, Massachusetts, New York, and Maryland are actively recruiting Philadelphia companies using a variety of incentive programs. Local life science companies report being approached by Baltimore, New York, Texas, and even Montreal, all of which are also trying to bolster their life science sector, to relocate. Availability of VC investment brings additional pressure, as companies often attempt to locate near its VC funders. If companies do relocate from Philadelphia, there could be a cumulative effect on the local life science market, and its 6th ranking could fall.

Conclusion #6 – Need for Competitively Priced CDMO and/or Multi-Tenant Biotech Manufacturing Space

In addition to demand for lab space, stakeholders suggested a need for additional CDMO and/or multi-tenant manufacturing space for cell and gene therapies within the city, especially for Mid-Size and smaller Mature companies. High-quality, secure manufacturing is essential for Mid-Size and early-stage Mature companies to advance through the FDA regulatory process. However, the cost of developing cGMP manufacturing space is very expensive, with PIDC reporting estimated development costs ranging from $700 PSF to over $1000 PSF. In the absence of such a multi-tenant facility, companies must develop their own in-house manufacturing capacity or retain a CDMO for production, inviting additional attendant cost, quality, and intellectual property concerns.

Interviewees for this study and a recent study of critical cell and gene therapy infrastructure by Ninigret Partners (prepared on behalf of PIDC and the Greater Philadelphia Chamber of Commerce (Chamber)) indicated that many companies currently separate research (lab) and manufacturing functions, with some companies locating facilities in the suburbs or in other lower-cost states. However, locating manufacturing within the city, in areas such as PIDC’s Lower Schuylkill Innovation District (immediately south of UCity) and South Philadelphia Navy Yard complex, would provide companies with greater oversight and convenience with this critical step in

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12 Current Good Manufacturing Practice, referring to facilities that comply with the FDA’s drug industry regulatory standards.
bringing products to market. An affordable multi-tenant cGMP manufacturing facility and/or additional CDMO space in Philadelphia would provide a compelling resource to local biotech companies and foster a more complete and competitive ecosystem to support cell and gene therapy from initial concept through commercialization. Increasing local manufacturing capacity would support retention of life science companies, create jobs, and retain Philadelphia’s standing as a leader in the biotech and advanced life sciences sector.

**Conclusion #7 – Public Sector Intervention is Important to Close Supply Gaps**

For the reasons detailed above, lab development in Philadelphia has lagged significantly behind demand. Companies are frustrated at having to make real estate choices that can be illogical, inefficient, and expensive to retain at least a portion of their business in the city. The situation is unsustainable if Philadelphia wants to remain a top-tier life science location.

With new suburban options coming online and 18 to 24 months until options become available in UCity, Philadelphia is at significant risk of losing companies. Moreover, development of a critical mass of biotech and advanced life science companies outside of Philadelphia could continue to drain companies even after supply is added in UCity.

Private developers of projects such as 3.0 University Place, One uCity Square, and Schuylkill Yards recognize the demand for lab space in Philadelphia but cannot readily obtain crucial Mid-Size and Mature anchor tenants willing to pay the rents required to finance elevated base building and fit-out costs. Likewise, developers have not yet resolved how to build affordable multi-tenant labs for less established, smaller companies outside institutional facilities or as a small component of a much larger project. Absent public sector intervention, slow timelines will hurt expanding companies, while the lagging supply of incubator and Graduate space will deter newer enterprises from remaining in Philadelphia. Prolonged wait times for space will produce an increasingly detrimental bottleneck in the development of Philadelphia’s biotech and advanced life science ecosystem. Various public sector strategies and policies are recommended below.
Recommendations

In the short-term, Philadelphia has an urgent need for lab space, particularly for Startup, Graduate, and Mid-Size companies. Public sector interventions are essential to ease market constraints and avoid the loss of companies, jobs, and investment to the suburbs and competitor cities. Over the longer-term, this strategy must evolve to address persistent supply deficits (especially for Startup, Graduate and smaller Mid-Size companies) and provide manufacturing capacity to ensure that Philadelphia remains competitive with peer locations.

Recommendation #1 – Deploy Public Resources to Get Major Pipeline Projects Over the Finish Line

Three of the four significant projects in UCity’s development pipeline (3.0 University Place, Schuylkill Yards, One uCity Square) are expected to alleviate existing supply deficits for larger Mid-Size and Mature companies (25,000 SF+). The 3.0 project will also provide some relief to Startup (1,500-2,000 SF), Graduate (2,000-10,000 SF), and smaller Mid-Size companies (10,000-5,000 SF).

These projects will not help companies requiring space in the next 18 to 24 months, but they are critical building blocks of a longer-term, robust network of lab spaces for growing Philadelphia companies and those outside the region. All efforts should be made to bring them online as soon as possible. The City, PIDC, and the Commonwealth of Pennsylvania (State) should work closely with each development team to deploy existing public tools, resources, and incentives to accelerate construction. In many cases, this collaboration is already underway. Table 12 identifies financing programs that can potentially support these projects.

While these financing programs have been effective tools in attracting and retaining companies in Philadelphia, they do not address the unique issues driving attraction and expansion of Startup, Graduate, and Mid-Size life science companies. As noted, advanced life science lab space is an emerging market requiring tailored financing tools to address specific costs and risks.
**Table 12 – Existing Public Sector Financing Tools That May Support Life Science Lab Development**

<table>
<thead>
<tr>
<th>Incentives</th>
<th>Grants</th>
<th>Loans</th>
<th>Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-Year Real Estate Tax Abatement (City)</td>
<td>Redevelopment Assistance Capital Program (State)</td>
<td>Business in Our Sites (State)</td>
<td>Can-Am Preferred Equity (PIDC/Can-Am)</td>
</tr>
<tr>
<td>Keystone Opportunity Zones (State)</td>
<td>Forgivable Loan/Economic Stimulus Program (City)</td>
<td>PA Industrial Development Authority (State, PIDC)</td>
<td></td>
</tr>
<tr>
<td>Keystone Innovation Zone (State)</td>
<td></td>
<td>Welcome Fund (EB-5) (PIDC/Can-Am)</td>
<td></td>
</tr>
</tbody>
</table>

- **Explore the Inclusion of Incubator/Graduate Space**: The four development projects are all at different points within the planning and financing process. To the extent possible, the City and PIDC should explore whether the inclusion of public financing can be leveraged to add or increase incubator/Graduate space.

- **Connect Potential Tenants with Project Developers**: The City and PIDC should coordinate with the four development teams to understand remaining tenant gaps and direct pertinent inquiries to the appropriate developer(s), as well as use their networks to see if additional requirements are in the market that may be suitable for one or more of the four projects.
Recommendation #2 – Public/Private Partnership to Develop Incubator and Graduate Space

The space to be provided by current pipeline projects is insufficient to support demand from Startup, Graduate, and smaller Mid-Size companies. Without public sector support, the risk of developing Incubator/Graduate lab space will remain largely unmanageable outside an institutional setting.

PIDC and the City should explore the viability of a public/private partnership (P3) that would combine public sector resources, institutional credit and space demands, and developer/operator expertise to overcome market constraints. Table 13 summarizes key constraints, with recommendations as to how they can be addressed.

Table 13 – Key Barriers to and Recommendations for Expediting the Development Pipeline

<table>
<thead>
<tr>
<th>DEVELOPER CONSTRAINT</th>
<th>SOLUTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevated construction costs (core/shell &amp; fit-out)</td>
<td>• Renovation vs. ground-up construction</td>
</tr>
<tr>
<td></td>
<td>• Proximity to, but outside high-cost cluster</td>
</tr>
<tr>
<td></td>
<td>• Finish level closer to Pennovation than CIC/Bio</td>
</tr>
<tr>
<td></td>
<td>• Public sector financing</td>
</tr>
<tr>
<td>Reluctance of commercial lenders to support projects with high-risk, pre-revenue tenants</td>
<td>• Institutional master lease</td>
</tr>
<tr>
<td></td>
<td>• Institutional or public guarantee</td>
</tr>
<tr>
<td></td>
<td>• Public sector financing</td>
</tr>
<tr>
<td>Higher risk of tenant default</td>
<td>• Institutional master lease</td>
</tr>
<tr>
<td></td>
<td>• Institutional or public guarantee</td>
</tr>
<tr>
<td></td>
<td>• Forgivable loan for tenant share of fit-out cost</td>
</tr>
</tbody>
</table>

The emerging nature of the biotech sector makes it difficult to accurately forecast demand for Startup/Graduate space. Currently, Startup/Graduate space in UCity is leased almost as soon as it comes on the market due to strong demand. Waiting lists are routine at Startup/Graduate spaces such as the Pennovation Center and CIC/BioLabs, with similar results expected for Pennovation’s B-227 lab space that will open in November 2020. The research fueling these startups is continuing and expanding.
RESGroup believes there is sufficient demand to support an affordable 25,000-50,000 SF multi-tenant lab facility for Startup/Graduate companies at an acceptable location. To explore the viability of this concept, the P3 should identify a former industrial building with key characteristics to support a lab renovation (e.g. ceiling height, systems capacity). UCity’s tight and expensive real estate market makes it unlikely that space will be available in the half-mile preferred radius, so the P3 should focus on (1) walkable and safe locations with retail and local amenities in the one-mile radius, and (2) locations outside the one-mile radius near transit hubs with bicycle and pedestrian connections, and in walkable and safe areas. These areas include Market Street west of 40th Street, the Lower Schuylkill Innovation District south of UCity, and Grays Ferry. The P3 should take into account the cost of streetscape, lighting, and other public improvements that may be needed to make the location viable for tenants.

The P3 should also explore the requisite level of fit-out and amenities. RESGroup’s interviews and surveys indicated that many Startups/Graduates don’t require CIC/Biolabs-level finishes and amenities, and would welcome more institutional, high-quality spaces like Pennovation, which leases at below-market rates. This would yield additional cost savings, although amenities may be required to compensate for a more distant location.

The P3 should also consider including space for diagnostic firms (e.g. Invisible Sentinel, Group K), which share some similarities with biotech firms, but are less regulated, require reduced fit-out, and advance through approvals more rapidly. Including space for diagnostic firms may further reduce fit-out expenses.

Several cities have successfully spurred the conversion of former industrial uses to lab space to fill gaps quickly and at lower cost:

- Yale University agreed to absorb unleased lab space in conversion projects to reduce risk, enabling developers to attract investment and successfully expand lab space in New Haven, CT.

- In 2005 Carnegie Mellon University in Pittsburgh, PA master-leased a 127,600 SF former industrial building to reduce the risk of conversion to dry labs. All space was leased prior to the completion of construction to companies such as Google, Apple, and Disney.
Recommendation #3 – Develop Tools to Assist Startup and Graduate Companies

Support for tenants is also required. At the Startup/Graduate levels, there is also a need for financing tools to address the tenant TI, affordability of lab rents, and tenant credit issues. Potential solutions include:

- **Forgivable Loan for Tenant Portion of TI:** Although some developers will front this cost and amortize it into rent, this option is not preferred by smaller companies seeking to focus dollars on research. Low- or no-cost fit-out loans are similarly unattractive, as they present the same cash flow constraints and a default risk for lenders. A better approach is a forgivable loan, similar to the City’s existing InStore Program for commercial corridors. InStore provides fit-out loans to property owners and forgives the loan if the space is occupied for five years. A similar program for life sciences (targeting companies requiring <10,000 SF) would enable developers to cover high fit-out costs, preserve Startup/Graduate operating dollars for research, and yield an expanded inventory of Startup/Graduate lab space over time. The City is currently exploring this option, subject to approval by Philadelphia City Council, as part of a larger economic incentive strategy. Alternatively, the City’s existing forgivable loan program, funded through the City’s economic stimulus dollars, could be modified to include TI for life sciences.

- **Reducing Tenant Credit Issues for Leasing:** Startup, Graduate, and smaller Mid-Size companies are pre-revenue and lack resources to support a creditworthy lease. This creates risk for developers and complicates commercial financing. To address this, the City and PIDC should explore development of a guarantee program to reduce credit-related risk to developers and lenders. For example, the New Jersey Economic Development Authority’s Access Program offers a flexible lending program with direct loans, loan participation, and guarantees to assist small businesses with limited credit history and collateral.

- **Rental Subsidies:** Financial assistance in the form of rental subsidies would also directly address affordability issues. NJ’s Small Business Lease Assistance Program presents a model for subsidizing for-profits’ initial annual lease payments. The NJ Economic Development Authority is administering this three-year pilot program with the goal of supporting businesses that could not otherwise afford first-floor commercial rents. In addition, the Authority’s NJ Ignite program subsidizes rental payments specifically for incubators occupying co-working spaces.
**Recommendation #4 - Aggressively Brand and Market the City to Attract Anchor Tenants**

Attracting anchor tenants is a key challenge for major life science projects in UCity. Companies interviewed and surveyed for this study noted the disconnect between UCity’s nationally-ranked research and vibrant biotech sector, and its lack of visibility on a national and international level. Attracting anchor tenants for new development projects is hindered by this lack of identity. A creative and ambitious branding and marketing program is essential.

In 2019, the Greater Philadelphia Chamber of Commerce (Chamber), in collaboration with PIDC, the City, and other key stakeholders, launched an ambitious three-year branding campaign, as part of its Cell and Gene Therapy and Connected Health Initiative. This includes strategic messaging, global industry outreach, and aggressive marketing of regional assets. The 2019 BIO Conference in Philadelphia brought companies and investors from outside the market to (1) see firsthand the cutting-edge research happening at UPenn and CHOP, (2) meet the vibrant cluster of companies that are commercializing spinout therapies, and (3) experience the vitality of the Navy Yard’s cluster of Mature companies and CDMOs. The Chamber\(^{13}\) is expanding on this with extensive market outreach, including the BIO 2020 conference in San Diego and others, targeted advertising, and traditional and social media.

The Chamber’s initiative dovetails with the City of Philadelphia’s Global Identity Project, a long-term branding effort that will unite city and regional stakeholders around a shared narrative to attract and retain businesses and talent, while increasing tourism and investment. More than half of Philadelphia’s international business comes from the life science and pharmaceutical sectors, creating a unique opportunity for expansion and growth through the Global Identity Project.

PIDC, the City, and the Chamber should continue supporting each in this important work, which will yield dividends for the City and the region. They should also explore other strategies, such as bringing life sciences site selectors and brokers to Philadelphia for a familiarization tour that highlights the research institutions, life science clusters, affordability and quality of life.

As it becomes established, the brand, talking points, and coordinated marketing strategy will build awareness of Philadelphia’s status as a leader in advanced life sciences and give investors, researchers, and companies greater confidence in the City. This, in turn, should make it easier to attract anchor tenants capable of launching new life science development in UCity.

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\(^{13}\) It should be noted that the Chamber has a regional focus, promoting Philadelphia and the surrounding counties.
**Recommendation #5 – Create a Dedicated Fund to Accelerate Future Lab Projects**

In the short-term, the City and PIDC are limited to working creatively with existing resources to (1) advance the major pipeline projects (3.0 University Place, Schuylkill Yards, One uCity Square, NextStageMed) to construction, (2) create a public/private development partnership for affordable Startup/Graduate lab space, and (3) support financing tools. However, for the long-term a new and dedicated fund should be created to facilitate the continued growth of the biotech and advanced life sciences sector. This fund would support financing gaps in the construction of new facilities, as well as tenant-side financing tools. Resources from the State, City, PIDC, and potentially philanthropic sources would be aggregated and leverage additional private sector investment. To achieve the necessary scale to support lab construction, the stakeholders should explore dedicating a portion of existing capital resources, such as the State’s RACP investments in Philadelphia, to this type of fund.

**Recommendation #6 – Develop a Tailored Incentive Program**

The City of Philadelphia has completed a study of the City’s available incentives for business attraction and retention. The study is not specific to the life sciences sector; however, it focuses on many issues important to them, including tools to support job creation, entrepreneurship, and business growth. One study recommendation is the creation of a tiered benefit structure for targeted industries, with life sciences as an example. As the City’s incentive strategy is refined and ultimately adopted by City Council, the City and PIDC should be actively engaged to advocate and maximize support for the life sciences sector.

PIDC and the City should also work together and potentially with regional partners, such as the Chamber, to develop a compelling and competitive package of existing incentives and financing tools, as well as new local and state resources, that can be used to attract developers of affordable lab space in Philadelphia. Peer cities and states have already dedicated significant funding to support advanced life sciences companies at all stages of growth, including the $1B+ Massachusetts Life Science Initiative, Massachusetts’ job creation tax credits and tax incentives, $3B Texas Cancer Prevention and Research Initiative, and New York State’s $500M initiative. These initiatives fund key capital projects, as well as attractive tax credits, development incentives, and financing tools that are used to compete directly with Philadelphia and the surrounding region. In nearby Maryland, Montgomery County offers investment in early stage companies, development bonuses, tax credits, exemptions from utility and development impact fees, and funding for business relocation and expansion.
Finally, the City and PIDC should leverage opportunities to educate life sciences companies and developers about the state’s Keystone Opportunity Zone (KOZ) Program and how it can reduce costs. KOZ is especially useful for new development and Mature companies with commercial sales, such as Integral Molecular, Iovance, and Wuxi AppTec. While KOZ site designations are time-limited, many viable KOZ sites exist in Philadelphia. The City’s recent incentives study concluded that the City should continue to leverage the KOZ Program to attract new investment to economically-challenged areas. This could provide a significant incentive for developing Startup/Graduate lab space and cell/gene/plasmid manufacturing space outside the main UCity cluster.

**Recommendation #7 – Expand Cell and Gene Therapy Manufacturing Capacity in Philadelphia**

PIDC and the Chamber recently completed a study of the critical infrastructure required to support growth and expansion of the cell and gene therapy sector in Greater Philadelphia. A key finding was the need for additional cell and gene therapy manufacturing capacity in the Philadelphia region to support institutional research needs, Startup/Graduate/Mid-Size companies engaged in the FDA approvals process, and Mature companies seeking reliable commercial production capacity. Much of this business is currently sent out-of-state, to providers in Maryland and Florida. Developing additional, competitively priced production facilities in Philadelphia would provide local biotech companies better options, while creating a compelling market advantage over competitor cities. PIDC’s development sites in the Lower Schuylkill and Navy Yard provide ideal locations for this type of facility, due to their proximity to research and healthcare institutions and major transportation assets. PIDC and the City should work closely with the Chamber and key partners to develop and execute a compelling business attraction campaign designed to secure a development commitment from an experienced manufacturer of cell and gene therapies, or an operator of multi-tenant cell and gene manufacturing facilities.

Due to the extraordinary expense of constructing these facilities, it is expected that the State, City and PIDC will need to develop a compelling financing and real estate package to attract a quality project. Some financing programs that are not suitable for lab projects can potentially be deployed on the manufacturing side (e.g. New Market Tax Credits), subject to eligibility. Federal Opportunity Zones should also be explored, as well as all other existing grant and loan programs administered by the State, City, and PIDC. Further, tax abatements such as KOZ could also be utilized.

As manufacturing facilities can have separate locations than other functions like research and administration, a project like this could also spur companies from outside Philadelphia to relocate within the City once they become more familiar with the depth and vitality of the local life science community.
Appendix

Online Survey

**Background**

An online survey was completed to obtain an understanding of the demand for lab space from as large a pool of life science companies as possible. RESGroup prepared the online survey instrument with input from PIDC and the City. The survey gathered information about company size, number of employees, location preferences, building and space requirements/amenities, rents, and lease term. Data was obtained separately for companies currently looking for space, and for companies who recently found space to help understand the potential level and characteristics of demand for space in Philadelphia. An email link to the survey was sent to over 300 companies via email distribution lists provided by market stakeholders of the BioBreak and PhillyBio organizations, as well as to Penn’s Wharton Entrepreneurship Venture Initiation Program.

With 66 responses, or a 22% response rate, the results were above the expected range for an external survey (10%-15%). The responses provide an indication of the need for lab space, location preferences, and other requirements that are most important for Philadelphia area companies.

The exact geographic distribution of the 300 companies is unknown but includes companies in the City of Philadelphia and in the surrounding metropolitan area. While our stakeholder interviews (see next section) focused mostly on early stage companies, those responding to the online survey represent a mix of sizes, types and stage of growth.

The information from the online survey was supplemented by more in-depth stakeholder interviews to provide a greater understanding of the characteristics of the demand for lab space.
Company Data

Overall respondents were generally smaller companies (12 employees or 2,250 SF of space), with averages skewed by a few larger companies participating in the survey (Table A1).14

<table>
<thead>
<tr>
<th># Employees</th>
<th>Space (SF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median</td>
<td>12</td>
</tr>
<tr>
<td>Average</td>
<td>190</td>
</tr>
</tbody>
</table>

Companies were asked for their focus area within the life sciences industry. The most popular responses were biologics/biotechnology and gene/cell therapy, with smaller numbers of pharmaceuticals, diagnostics, immunotherapy, and medical device companies also responding.

Life science companies are very dynamic and can grow quickly or end abruptly, especially during their early stages. As such, nearly 60% of respondents reported being at their current location for less than two years (Figure A1). Only 32% had remained for over five years.

14 One response was eliminated because it represented the number of worldwide employees and not the local amount.
Further, approximately 95% of respondents reported that they will need to find new space within two years (Figure A2). These rapidly changing space needs were even reflected by all companies. The median lease term for these companies is only 1.5 years, and the average was 2.9 years. These shorter terms may be viewed by developers as riskier, and, when combined with the higher cost of building lab space, help explain their reluctance to develop new lab space in the Philadelphia market. The lack of long-term commitments makes it difficult for developers to obtain financing for new construction particularly with the risk of such large investments required for lab building infrastructure.

However, the need for new space could represent a significant market opportunity, adding employment within the City and growing the life science eco-system in Philadelphia. Approximately 45% of respondents answering the question are currently looking for space. Moreover, company footprints are growing; based on the median data for the 22 respondents, these firms could need over 60,500 SF of new space within the next two years. As this data is only for 22 companies, the actual market requirement is likely much, much higher.

When asked what properties these firms were considering in their search, they identified properties in uCity, Center City, but also in suburban Philadelphia, New Jersey, and locations as far as Austin, Texas. This suggests these new jobs and economic activity may be lost to locations outside the City, or even outside the State, if more lab space isn’t added to the market in a timely fashion to meet current and near-term demand.

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15 Median size increase from 2,250 to 5,000 SF for companies looking for new space \((5,000 - 2,250 = 2,750\text{ SF} \times 22\text{ respondents} = 60,500\text{ SF of new space})\)
**Location Preferences**

Respondents currently looking for space were asked to rate on a scale of 1 to 4 (4 being the best) which of the following attributes were most important when selecting a location. Figure A3 below presents the weighted averages for each attribute. The most important attribute overall was proximity to an educated workforce, followed by cost, proximity to universities/research institutions, access to mass transit, and public incentives. Proximity to similar companies, restaurants, hotels, and retail, and state and local business taxes were also important. Personal auto access was not a priority for these companies.

**Figure A3 – Which of the following attributes were most important when selecting a location?**
Given how short the lifespan of these types of companies can be, locations with high concentrations of skilled labor benefits workers, too. If one startup fails, workers do not have to relocate to another area to find employment, also increasing the attraction for companies seeking a large pool of talent.

When asked further about acceptable distances from universities and health care institutions, 32% of respondents wanted to be within walking distance, with 42% accepting a 20-minute train/bus trip or drive. Only 16% of companies would accept being more than 20 minutes from them.

When asked to rank specific locations, companies looking for space preferred UCity, followed by Center City, suburban Philadelphia, the Navy Yard, and Princeton.

The UCity and Center City locations offer excellent access to a skilled labor pool of scientists and life science workers who tend to be younger and prefer working and living in urban environments with mass transit. These areas also have excellent access to universities, similar companies, restaurants, hotels, regional rail, and the airport.

However, the Philadelphia suburbs remain attractive to some companies due to the lower rents and fewer local taxes.

To understand what potential locations could build upon the existing supply of space in UCity, companies were asked whether they would consider new lab developments at three potential locations: near the Pennovation Center; in the Lower Schuylkill (near Bartram’s Gardens); and Market Street west of 40th Street. The companies currently looking for space reacted most positively to the Market Street location (over 85% would consider it), with less enthusiasm for Pennovation (75%) location. The Lower Schuylkill site was much less desirable due to its lack of mass transit access to UCity, and its fewer amenities needed to attract employees.
Property Information

Lab vs. Office Space

Respondents currently occupy spaces with a significant portion of lab fit-out. Over 60% of respondents indicated that their leased premises have equal amounts of lab and office space or are mostly lab space, while less than 40% occupy units that are mostly office space (Figure A4). However, respondents currently looking for new space require an even a higher proportion of lab space. For these companies, 90% will require equal amounts of lab and office space or more lab space. Only 10% will require space mostly finished for office use (Figure A5).

Physical Attributes

Respondents were asked about the most important physical attributes for their leased space and for the building common areas. For companies currently looking for new space, the most common requirements were biological fume hoods, wet lab space, dry lab space, and tissue culture rooms. Outdoor space and containment facilities were the least required features within a company’s leased space.
With respect to building common areas, the most requested attributes were kitchens/coffee stations and meeting rooms (private spaces and not just “fishbowls”), followed by freezer farms, and outdoor space. The least required were fitness facilities, indoor recreation, and networking/business programming.

Given the typical size of the respondent companies, this data suggests that these smaller tenants do not need spaces with lots of amenities, but with functional labs. It is acceptable for amenities such as meeting rooms, kitchens, freezer farms, and outdoor space can be provided in the common area as shared space.

**Rent Amounts**

Companies currently looking for space were asked to indicate the highest rent they could pay at their new location (Figure A6). The most common amount was $30-$34 PSF (24%), with $20-$24 (18%) tied with $40-$44 (18%). Over half could pay $24-$34 PSF, one in three could pay $40 or higher.

Given responses about median company sizes, it appears that many of these smaller (and likely earlier stage) companies are relatively price sensitive. However, a significant portion of companies could pay the $30-$35 PSF asked for 2nd generation space in uCity, with some respondents able to pay rent asked for new space ($40-$55 PSF).
**Stakeholder Interviews**

Stakeholder interviews were conducted with a sample of 13 life science companies and with 10 institutions/developers/property owners provided by the Client. The companies selected represent Startups, Mid-Size companies, and Mature companies. These interviews obtained answers to questions not well suited to the online survey format and provided an opportunity to further understand demand and the growth potential for life science eco-system in Philadelphia.

The following companies, institutions, and developers/property owners were interviewed between March and May 2019:

**Companies**
- Amicus Therapies
- Aro Biotherapeutics
- Carisma Therapeutics
- Century Therapeutics
- Chondrial Therapeutics
- Context Therapeutics
- Group K Diagnostics
- Integral Molecular
- Invisible Sentinel
- Longevity Biotech
- Tmunity
- Vironika
- WindMIL Therapeutics

**Institutions and Developers**
- Brandywine Realty Trust (Schuylkill Yards)
- Cambridge Innovation Center (Biolabs)
- Drexel University
- Militia Hill
- University City Science Center
- University of Pennsylvania
- University of Pennsylvania School of Medicine
- University of the Sciences
- University Place Associates (3.0 University Place)
- Wexford (uCity Square)
Location Preferences

Company stakeholders indicated that access to labor is the primary concern for their firms, and that most scientists and lab workers prefer living and working in urban areas. Given the area’s excellent mass transit access, and the concentration of universities, health care institutions, and other life science companies, UCity was frequently mentioned as a preferred location within the Philadelphia metro area. Its access to regional rail and the airport were also cited as location benefits, as these facilities provide convenient access to VC investors in the northeast corridor and west coast. One stakeholder that recently moved to UCity from the suburbs noted how vibrant the area’s life science’s community was, especially compared to their prior location. A few stakeholders expressed concerns about UCity locations west of 38th Street, but anticipated that the area will improve quickly given the current pace of growth.

Stakeholders also indicated that Center City, especially in areas proximate to 30th Street Station, was also desirable. Center City is also easily accessible to life science workers via mass transit and commuter rail and a short train or car ride to the universities and institutions in UCity. Center City also has excellent access to supporting business amenities, including hotels, restaurants, and retail that facilitate various business activities. It was noted that Center City does not have the high concentration of life science companies that many preferred and is still considered a secondary location to UCity.

Some stakeholders indicated that their office and lab spaces are in separate locations, with most having lab space in the City while retaining corporate offices in the suburbs. Access to talent and cost were cited as reasons for the dual locations, with lab/research employees living predominantly in the City and corporate office workers residing in the suburbs. These companies were more established and larger than the others, with higher ratios of office space to lab. However, one company did have the opposite arrangement, with lab and manufacturing space in a suburban location, and their offices located in Center City. Interestingly, proximity to labor was also their justification for this split.

Financial Considerations

Funding Limitations

While cost was mentioned as a concern for startup companies, funding limitations were not considered a major impediment. Stakeholders indicated that many landlords were willing to structure deals in a way that accommodated the tenant’s needs, especially if the landlord was trying to establish a relationship with a fast-growing tenant. Some stakeholders, primarily Startups and Mid-Size companies that were unable to pay for improvements, were able to find 2nd generation space that required only minimal updates to meet their needs. Others were able to have the improvements amortized as part of their monthly rent. For users who required less sophisticated HVAC, a mobile system in a prior medical office building provided acceptable lab space for diagnostics.
Rents

Company stakeholders indicated a broad range of rental rates, suggesting varied price sensitivities depending on the firm’s stage and size, and with smaller and younger companies generally more price sensitive than larger ones. Tenants typically did not pay up front for significant tenant improvements, with required work paid for by the landlord including the tenant improvement costs amortized as part of the rent.

Space Search Issues

Stakeholder companies were asked to discuss any issues they had during their search for lab and office space. The following issues were identified:

Need for More Incubator Space

When the Science Center relocated buildings and changed their mission, their former tenants needed to find new lab space. Since the CIC/BioLab charges much higher rents for lab benches than the Science Center, some of the earlier stage and smaller companies had to scramble to find more affordable space. These stakeholders emphasized the need for less expensive incubator space in Philadelphia that doesn’t have all of the expensive finishes, fixtures, and equipment that CIC/Biolab space does.

Further, the high amount of shared lab space (86 benches) at the CIC was viewed negatively by some stakeholders, who require private lab space for intellectual property (“IP”) issues. The 13 private lab units at the CIC did lease out more quickly than the shared space, which may still have minor vacancy.

Need for More Graduation Space

Tenants leaving incubators and “graduating” to the next stage are also having trouble finding space in their preferred location of UCit. Companies at this stage typically have access to Series A funds, but still require flexible lease terms that developers find risky. Also, their small size of 2,000-10,000 SF would require building owners to divide up floor plates, adding public corridors and lobbies that would reduce a building’s value.

Need for Shorter-Term Swing Space

However, the half-floors of open lab space at CIC did find an unintended type of user – larger companies needing swing space. A company waiting for its permanent space fit-out leased two floors of open space at the CIC but will vacate the space in the late fall of
2019. Once vacant, other companies might view the shared lab space there as a similar opportunity as swing space until the pipeline of proposed project is constructed and available for occupancy.

**Interim Ad Hoc Solutions**

Company stakeholders are aware of the many new proposals for space in the market (3.0 University Place, uCity Square, Schuylkill Yards) and have been solving space issues on an ad hoc basis in the meantime. Companies have been dividing lab and office functions, postponing expansions and growth, or, as noted above, using the CIC/Biolab for temporary space. Unfortunately, unless new lab space is developed soon, more and more firms may be settling for locations outside of the City or the State.

**Holding Space for Future Needs**

Mid-Size companies and institutions, in response to the dearth of lab space in the City, sometimes lease more space than they currently require to allow for future expansion, as the cost of vacant space is less problematic than the inability to find space. This drives up the costs for smaller, less-well funded companies, and restricts their growth within the City. One suggestion was to have this vacant shadow space be made available as interim space for smaller companies.