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# **THE COST OF VACANT AND BLIGHTED PROPERTIES IN PITTSBURGH:**

## **A Conservative Analysis of Service, Tax Delinquency, and Spillover Costs**

Center for Community Progress Report to the Urban Redevelopment Authority of  
Pittsburgh, Pennsylvania



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## ABOUT CENTER FOR COMMUNITY PROGRESS

Founded in 2010, the Center for Community Progress is the only national 501(c)(3) nonprofit organization solely dedicated to building a future in which entrenched, systemic vacancy and abandonment no longer exists in American communities. The mission of Community Progress is to ensure that communities have the vision, knowledge, and systems to transform vacant, abandoned, and deteriorated properties into assets supporting neighborhood vitality. As a national leader on solutions for blight and vacancy, Community Progress serves as the leading resource for local, state, and federal policies and best practices that address the full cycle of property revitalization.

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# EXECUTIVE SUMMARY

The “Most Livable City,” the “Most Affordable City,” “One of the Best Cities for Young Families.” These are just a few of the accolades conferred in 2016 on the City of Pittsburgh.<sup>1</sup> Across the country, many see Pittsburgh as the “comeback kid” of rust belt cities, and have watched with great interest as the smoky, steel industrial city of the past transforms into a more green, resilient city of the future. The Pittsburgh of today is focused on new industries, like technology, health services, and education, to support exciting and fresh cultural and economic opportunities. Despite losing half of its population over the last 70 years, Pittsburgh is finally growing again, and Pittsburghers retain a profound sense of pride, strength, and activism. But as with any transformation of this scale, the massive changes taking place across Pittsburgh and the region, coupled with significant urban renewal projects, have had an inequitable impact on neighborhoods across Pittsburgh – an impact that has only exacerbated the effects of decades of disinvestment in neighborhoods.

Pittsburgh is a city of neighborhoods, where the strongest of real estate markets meets the weakest, where up until very recently properties on one side of Penn Avenue could be sold for \$500,000, and those on the other remain vacant and abandoned and can hardly be given away. Amidst the incredible hills and vistas, rich culture and history, is a tale of two cities that presents local leadership with the challenge of how to ensure that the healthiest of neighborhoods continue to thrive, while those neighborhoods in distress get the resources necessary to protect and value their residents.

In Pittsburgh and across the country, vacant properties, in particular those that are abandoned and left to fall into disrepair, affect neighborhoods of all strengths and impose costs - financial, psychological, and public health - on the entire community. The fly-by-night dumping of old tires and construction scraps in a vacant lot with three-feet high weeds is an insult to the homeowner next door who takes pride in the home her family has lived in for generations. The remnants of a building decimated by fire and left vacant for months near a commercial corridor dissuades shoppers from visiting local businesses and supporting the neighborhood economy. The form of the neglect reflected in these and other similar properties varies widely, but the

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<sup>1</sup> Throughout this report, the term “Pittsburgh” will be used when referring to the geographic area of the City of Pittsburgh and the term, “City,” will be used to refer to the municipal government of the City of Pittsburgh.

impact of that neglect uniformly discourages local investment, poses health and safety risks to the community, decreases property values, and strains the limited resources of local governments.

The strain that vacancy and abandonment can have on the budgets of local governments across the country can be seen in the increased resources needed to enforce local housing and building codes and to respond to police and fire calls at vacant properties, and in the loss of property tax revenue that is generally associated with abandoned properties. Pittsburgh has made great strides in recognizing that vacancy and abandonment impose substantial costs on its community, like those previously mentioned, and is taking steps to better understand and prioritize the elimination of those costs. The Mayor's Office, the Department of City Planning, the Urban Redevelopment Authority of Pittsburgh (URA), and so many other Pittsburgh departments and authorities have worked tirelessly to coordinate those efforts, understanding that while each may have a different charge, they are all equally impacted by vacancy and abandonment. As part of this ongoing effort, starting with the Land Recycling Task Force, the City's Open Space Plan, and carrying through to current system-wide initiatives, there was a realization of the dire need to get a better and more definite sense of just how much money this problem costs Pittsburgh, its residents, and so many others.

## ASSESSING THE COSTS OF VACANCY AND ABANDONMENT IN PITTSBURGH

In order to more accurately assess the distinct and quantifiable impact of vacancy and abandonment, the URA engaged the Center for Community Progress ("Community Progress") in the summer of 2016 to perform what is commonly referred to as a "cost of blight"<sup>2</sup> study (the "analysis"). To conduct this analysis, Community Progress retained the services of a consultant, Dr. Dan Immergluck, PhD, a national housing and real estate expert skilled in the modeling and assessment methods required to produce an accurate and conservative estimate of the costs imposed by vacant properties for municipalities and taxpayers. Community Progress previously engaged Dr. Immergluck to perform similar analyses for two other cities: Toledo, Ohio,<sup>3</sup> and Atlanta, Georgia.<sup>4</sup>

The intent of the analysis, which is included in this report as "Appendix A," is to raise awareness of the true costs incurred by Pittsburgh related to vacant and distressed properties. Not only

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<sup>2</sup>When the words "blight" or "blighted" appear in this report, it is helpful to simply consider the words synonymous with the term "distressed."

<sup>3</sup> See *A Conservative Analysis of Costs Imposed by Vacant and Blighted Properties in Toledo: Conducted at the Invitation of the Junction Neighborhood* (Immergluck, Toering, Abdelazim June 2016), available for download on the Community Progress website at: [http://www.communityprogress.net/filebin/160630\\_TASP\\_LCLRC\\_Toledo\\_Cost\\_of\\_Blight\\_Study\\_Final.pdf](http://www.communityprogress.net/filebin/160630_TASP_LCLRC_Toledo_Cost_of_Blight_Study_Final.pdf).

<sup>4</sup> See *The Cost of Vacant and Blighted Properties in Atlanta: A Conservative Analysis of Service and Spillover Costs* (Immergluck, January 2016), available for download on the Community Progress website at: [http://www.communityprogress.net/filebin/Cost\\_of\\_Vacant\\_and\\_Blighted\\_Immergluck\\_FINAL\\_02.17.16.pdf](http://www.communityprogress.net/filebin/Cost_of_Vacant_and_Blighted_Immergluck_FINAL_02.17.16.pdf).

should this analysis help to measure the financial impact that vacancy and abandonment impose on taxpayers, but it should also help local leaders to better understand the scale of the problem, consider how to more appropriately prioritize the budgets of public agencies, and to make the case for an increase in resources used to target solutions.

## WHAT IS THE SCALE OF THE PROBLEM IN PITTSBURGH?

The primary subset of properties on which this analysis is focused is vacant properties.<sup>5</sup> Pittsburgh, which has a population of more than 300,000, has an inventory of more than 125,000 total parcels of taxable property. Nearly 20 percent of those properties, or just under 24,000, are considered vacant properties.<sup>6</sup> Just under 7,500 of the almost 24,000 vacant properties contain a vacant structure or building, while more than 16,000 are vacant lots. Most of the vacant structures or buildings are residential properties (5,028), as opposed to commercial property (660) or publicly owned property (1,003). Conversely, most of the 16,257 vacant lots are publicly owned (10,671).

**Table 1: Simple Breakdown of Pittsburgh Vacant Properties<sup>7</sup>**

Total Vacant Lots	16,257
Total Vacant Properties With Structures	7,490
Total Vacant Properties	23,757

Each of the almost 24,000 vacant properties in Pittsburgh pose a significant burden and cost on Pittsburgh taxpayers. For example, almost 6,000 of the 24,000 vacant properties in Pittsburgh have been tax delinquent for more than three years, denying the City of a significant source of revenue that could be used to fund efforts to combat vacancy and abandonment. And, there are nearly 1,400 vacant residential properties, out of almost 7,500 total vacant properties with structures, that are considered to be in distressed physical condition, imposing an entirely different set of costs on neighborhoods. The costs imposed by these distressed vacant properties include major financial costs to a community, like the reduction of neighboring property values, but also include those costs that are less concrete or easy to define, like increased health and safety risks to neighbors and the decline of resident morale.

<sup>5</sup> While substandard occupied properties also impose costs on local governments, properties identified as vacant are easier to identify and assess for the purposes of the kind of analysis undertaken in this report.

<sup>6</sup> See Section 1 of the analysis in "Appendix A" for detail on the method utilized to quantify the number of vacant properties in Pittsburgh. For the purposes of this report, the term "vacant properties" includes all properties in Pittsburgh that are vacant, including those that contain a vacant structure or that are vacant lots.

<sup>7</sup> Table 1.2 in "Appendix A" of this report provides a more detailed breakdown of the 23,757 vacant properties in Pittsburgh.

# OVERVIEW AND KEY FINDINGS ON THE COST OF VACANCY AND BLIGHT IN PITTSBURGH

Dr. Immergluck's analysis was designed to answer two key questions: First, what direct costs does Pittsburgh incur associated with vacant and vacant tax delinquent properties? Second, what costs do distressed vacant properties impose on neighboring residential property?

## 1) How much does it cost Pittsburgh taxpayers, in terms of providing essential services and lost tax revenue from tax delinquent properties, to address vacant properties?<sup>8</sup>

*Pittsburgh spends nearly \$2 million per year to provide code enforcement, police, and fire services to vacant properties.* Using data compiled from 2015 and 2016, it is estimated that code enforcement officers, police officers, and fire personnel spend tens of thousands of hours per year responding to complaints, requests for service, or conducting inspections related to vacant property in Pittsburgh. The \$2 million figure does not include funds spent on demolition efforts throughout Pittsburgh, nor does it include a number of related costs, like court costs or other legal fees associated with code enforcement.

*Vacant properties that are tax delinquent cost taxpayers more than \$2.3 million per year in lost property tax revenue.* Of the nearly 25,000 vacant properties in Pittsburgh, almost 5,800 have been property tax delinquent for three (3) or more years based on 2016 Allegheny County property tax data acquired by the URA. The \$2.3 million annual figure is attributable only to the average cost of delinquency of those 5,800 properties.

## 2) What impact do distressed vacant properties have on property values of surrounding residential properties and what are the property tax implications of that decrease in value?

*The cumulative City-wide loss of property value for residential properties located within 500 feet of a vacant residential property in distressed physical condition is \$266 million.* Analysis of data provided by the URA reveals that vacant properties identified as being in poor condition have a negative "spillover" effect on the property values of properties located within 500 feet of the vacant parcels. The average spillover effect of each vacant property in poor condition on cumulative home values within 500 feet was more than \$194,000.

*Based on current millage rates, the \$266 million loss in property value results in an annual loss of \$4.8 million in property tax revenue.* The lost property tax revenue is an annual decline that may increase in future years should the \$266 million in lost property value increase.

<sup>8</sup> "Essential services" is used in this report to refer to services related to the enforcement of housing and building codes, police services, and fire services. Services like the clearing of trash and garbage from properties by the Department of Public Works and the legal costs of prosecuting code violations are important but are not considered "essential services" for the purposes of this study. Demolition, on the other hand, is not included because it is seen as an intervention strategy that, when strategically carried out, can lead to a decrease in the cost of essential services.

**Table 2: Estimated Costs Due to Vacant Properties in Pittsburgh<sup>9</sup>**

	Annual Costs	One-Time Losses <sup>10</sup>
<b>Service Costs</b>		
Code Enforcement	\$246,290	
Police Dispatch Costs	\$1,126,566	
Fire Department Dispatch Costs	\$580,025	
<b>Losses due to Long-term Tax-Delinquent Parcels</b>		
Annualized Tax Loss	\$2,338,206	
<b>Spillover Costs</b>		
Loss in Residential Property Values		\$266,332,325
Decline in Property Tax Revenues	\$4,812,956	
<b>Total Estimated Costs</b>	<b>\$ 9,104,043</b>	<b>\$ 266,332,325</b>

In addition to the staggering one-time loss in property value of \$266 million due to vacant distressed properties, the analysis identifies the striking amount of annual and ongoing costs posed by vacant properties to Pittsburgh. That annual total cost of \$9.1 million, a figure which includes the direct costs of providing code enforcement, police, and fire services to vacant properties, as well as the loss of tax revenue from tax delinquent vacant properties, and the lost property tax revenue related to the \$266 million in lost property values, will continue to accrue and most likely increase in future years if efforts are not made to address vacant property. Those numbers reveal the need for Pittsburgh and its partners to continue to stress the importance of prioritizing new and improved approaches to eradicating vacancy and blight in Pittsburgh.

## A NOTE ON DATA AVAILABILITY AND COLLECTION

In order to collect the data necessary for Dr. Immergluck's analysis, Community Progress had the opportunity to work over a six-month period with the URA and a range of City departments and stakeholders and gain insight into data storage, accessibility, and sharing practices throughout Pittsburgh. Based on that experience and our experience performing

<sup>9</sup> This chart reflects a simplified version of the chart listed in Table 5.1 of the analysis. As discussed in the analysis, these costs are not comprehensive and do not include all costs that might be associated with vacancy and blight.

<sup>10</sup> The value listed in the "One-Time Losses" column is a one-time snapshot of the loss in residential property values based on the data available at the time the calculation was made.



similar data analysis studies throughout the country, we offer the following key takeaways for Pittsburgh leaders and stakeholders to consider.

## AVAILABLE DATA TO HELP DEFINE THE PROBLEM

As Community Progress has seen throughout the country, it is incredibly difficult to develop and implement the strategies needed to address vacancy and blight without a true understanding of the scope, definition, and location of the problem. While the URA, the City, and Allegheny County have access to hundreds of related data sets, it became clear very early in our engagement that the scope of vacancy and blight in the City, in particular the number, location, and condition of vacant properties, was relatively undefined.

We recommend that the URA and the City consider commissioning a comprehensive data set that identifies the number and condition of vacant properties in the City and make plans to regularly update and maintain such data to ensure accuracy and avoid stagnant data. Such a survey could provide local leaders with a number of data points that could be effective in the fight on blight. Relevant data points might include, for example: where problematic properties are located, ranking criteria to prioritize code enforcement or demolition, and occupancy status. The city of Atlanta, Georgia provides an example of what such a survey might provide, as does a similar survey conducted in Toledo, Ohio.<sup>11</sup>

## DATA COLLECTION AND ACCESSIBILITY

Like many cities across the country, the data related to vacant properties in Pittsburgh is spread across multiple local government agencies and departments and is stored in a variety of different formats and databases. Despite the URA's great work compiling the majority of data requested at the outset of our engagement, much of the requested data was housed in various City departments and stored in different formats, making follow up requests for data or clarification somewhat time consuming and difficult to coordinate.

Leaders in Pittsburgh should consider continuing to build on the existing relationships between the URA, Pittsburgh, and Allegheny County to ensure that data related to vacancy and blight is gathered, tracked, and analyzed on a regular basis and is stored and accessible in a centralized database, such as one housed in the URA or the Western Pennsylvania Regional Data Center. Such efforts could be strengthened by providing regular training, communication, and updates to various City and County department heads and teams to clarify the importance of analyzing vacancy and blight and how their department data is critical to that purpose.

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<sup>11</sup> See *The Cost of Vacant and Blighted Properties in Atlanta: A Conservative Analysis of Service and Spillover Costs* (Immergluck, January 2016), available for download on the Community Progress website at: [http://www.communityprogress.net/filebin/Cost\\_of\\_Vacant\\_and\\_Blighted\\_Immergluck\\_FINAL\\_02.17.16.pdf](http://www.communityprogress.net/filebin/Cost_of_Vacant_and_Blighted_Immergluck_FINAL_02.17.16.pdf). See also *A Conservative Analysis of Costs Imposed by Vacant and Blighted Properties in Toledo: Conducted at the Invitation of the Junction Neighborhood* (Immergluck, Toering, Abdelazim June 2016), available for download on the Community Progress website at: [http://www.communityprogress.net/filebin/160630\\_TASP\\_LCLRC\\_Toledo\\_Cost\\_of\\_Blight\\_Study\\_Final.pdf](http://www.communityprogress.net/filebin/160630_TASP_LCLRC_Toledo_Cost_of_Blight_Study_Final.pdf).

# CONCLUSION

Community Progress hopes that the analysis provided in this report will supply the URA and the City with a tool that can be used not only to simply quantify the costs associated with vacancy in Pittsburgh, but to also make the case for additional investment in local efforts directed at improving approaches to all properties impacted by vacancy and blight. A very high-level view of what such an improved approach might look like can be seen in the following recommended road map:

1. Invest in the data and resources needed to fully understand the scope of the problem, such as commissioning a comprehensive survey of vacancy and property conditions in the entire city and ensuring data is stored and managed in a centralized, accessible and sustainable manner.
2. Increase or re-prioritize the budgets of existing City departments and other local agencies that address issues related to vacant properties to ensure those organizations are responsive to the true impact that vacant and vacant distressed properties have on the City and its residents.
3. Appropriately invest in strategies that have been shown to mitigate the negative impacts of vacancy and blight. The City should seek to equitably target such strategies in neighborhoods where vacancy causes residents the most harm, particularly in those neighborhoods that have seen decades of inequitable investment and policies.
4. Ensure the strategies used to mitigate the negative impacts of vacancy and blight are carried out in a way that equitably stabilizes or revitalizes neighborhoods. Such strategies should include, for example, the implementation of a “fix it up, pay it up, give it up” approach to code enforcement that is tied to an efficient, effective, and equitable delinquent property tax enforcement system;<sup>12</sup> working with the Pittsburgh Land Bank to prioritize the acquisition and reuse of vacant properties based on the needs and priorities of residents and neighborhoods, especially in those areas that are most impacted by vacancy and blight; and strategic demolition connected to reuse policies that include proper lot maintenance and greening.
5. Use this study as a baseline to measure year over year progress, particularly as it relates to the cost of providing essential services to vacant properties.

The dedication and the efforts already undertaken by the URA, the City, and their partners throughout Pittsburgh to improve these approaches are admirable. We look forward to the innovative steps local leaders continue to take to become national leaders in the fight against vacancy and abandonment.

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<sup>12</sup> A more detailed discussion of what a “fix it up, pay it up, give it up” approach to code enforcement looks like and how it should be tied to an efficient, effective, and equitable delinquent property tax system can be found in Part I of the report, *“Laying the Foundation: Building an Improved Approach to Problem Properties in Rockford”* (Community Progress 2016), available on the Community Progress website at: [http://www.communityprogress.net/filebin/Rockford\\_Report\\_9.22.16\\_Final\\_updated.pdf](http://www.communityprogress.net/filebin/Rockford_Report_9.22.16_Final_updated.pdf).

# APPENDIX A: THE COST OF VACANT AND BLIGHTED PROPERTIES IN PITTSBURGH:

A Conservative Analysis of Service, Tax Delinquency, and Spillover Costs

Dan Immergluck, PhD<sup>1</sup>

March 23, 2017

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# INTRODUCTION

Vacant properties are a continual concern in community development and neighborhood planning in the U.S. (Accordino and Johnson, 2000; Mallach, 2006; Sternlieb and Indik, 1969). The roots of vacancy, and the abandonment of those vacant properties, at the neighborhood level have ranged from declining employment and population, to metropolitan sprawl, to – especially recently – subprime lending and its accompanying foreclosures.

Vacant properties – especially those in poor condition – have negative impacts on neighborhoods and cities. For example, a variety of studies have found negative spillover impacts of vacant and/or abandoned homes on neighboring property values.<sup>1</sup> In a study of Columbus, Ohio, Mikelbank (2008) found that vacant properties reduced the price of nearby homes by more than \$4,000. In a similar study of Flint, Michigan, Griswold and Norris (2007) determined that each vacant structure within 500 feet of a home reduced the home value by over 2 percent. In a study of Baltimore, Han (2014) also found that vacant homes had a negative effect on nearby property values. Vacant properties are also associated with higher crime rates. Cui (2010) analyzed crime and foreclosure data in Pittsburgh and found that violent crimes within 250 feet of a foreclosed home increased by more than 15 percent once the foreclosed home became vacant, with similar effects on property crime. Branas, Rubin, and Guo (2012) found that vacant property is among the strongest predictors of assault among a dozen demographic and socioeconomic variables.

The negative effects of vacant properties, especially those in poor condition, tend to take two general forms. First, vacant properties impose direct service costs on code enforcement units, police departments, fire departments, court systems, and other governmental agencies. Second, vacant properties can impose negative “spillover” costs on nearby neighborhoods, including lower property values and higher crime rates.

Before summarizing the findings of this report, it is important to clarify the terms used to describe the properties analyzed. When the term “vacant properties” is used, that term means all residential, commercial, and publicly owned parcels of real estate in Pittsburgh that are vacant and includes parcels that contain structures and parcels that are simply vacant lots. When the term “distressed” is used to describe vacant properties, that refers to vacant residential properties that contain a structure that is classified by Allegheny County as in poor, very poor, or unsound condition, as well as those vacant residential properties that contain a structure are condemned.

In this analysis, conservative measures of some of the chief costs imposed by vacant properties and vacant distressed properties in Pittsburgh are formulated. The analysis is organized into three sections. Section 1 describes the construction of a Vacant Properties Data Set utilizing both a Distressed Inventory file from the City of Pittsburgh’s (City) Department of City

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<sup>1</sup> Negative spillover impacts refer to the negative effect that nearby problem properties have on home values.

Planning (DCP) and a file of vacant addresses based on United States Postal Service (USPS) data. Section 2 estimates direct service costs in terms of code enforcement, police, and fire costs related to vacant properties. Section 3 estimates the loss of property tax revenue due to vacant properties that have been tax delinquent for at least 3 years. Then, Section 4 estimates the spillover costs of distressed vacant properties on residential property values, and the lost property tax revenues associated with such spillover costs.

The analysis yields an estimate that the City incurs just under \$2 million in annual direct costs for the provision of code enforcement services, fire services, and police services (collectively referred to as “essential services” in this report) related to vacant properties, with another \$2.3 million in annualized losses due to tax delinquent vacant properties, and \$4.8 million in lost property tax revenues due to the spillover costs of distressed vacant properties on home values. This brings the annual cost estimate up to approximately \$9.1 million. The analysis yields a best, reasonable estimate of losses in home values in the City due to distressed vacant properties of \$266 million. In the sections following, an even more conservative, lower bound estimate of these costs is provided to be particularly cautious in the cost estimation process.

Table 1.1 breaks down those annual estimates more precisely. The nearly \$2 million in annual direct costs, discussed in more detail in Section 2 of this report, includes an estimate of almost \$250,000 per year spent on code enforcement services (or, about \$150 per year for each vacant property inspected); an estimate of more than \$1.1 million in annual police service costs provided to vacant properties (nearly \$1,500 per vacant property); and total annual fire costs of close to \$600,000 related to vacant properties (or an average of nearly \$900 per vacant property). The \$2.3 million in annualized losses related to tax delinquent vacant properties, described in Section 3, come to just under \$400 per vacant property. Finally, the spillover costs of vacant distressed properties as determined in Section 4 impose a loss in annual property tax revenue of over \$4.8 million for an average of \$3,513 that can be attributed to each vacant, distressed property.

**Table 1.1 Per-parcel Annualized Costs for Vacant Parcels/Structures**

	Total Annual Costs	Number of Affected Properties <sup>2</sup>	Per-Property Average Cost, per year
Code Enforcement Costs	\$246,290	1,659	\$148
Police Costs	\$1,126,566	779	\$1,446
Fire Costs	\$580,025	653	\$888
Tax Delinquency Costs	\$2,338,206	5,893	\$397
Annual Property Tax Impact of Spillover Costs	\$4,812,956	1,370	\$3,513

<sup>2</sup> Affected properties includes vacant properties and vacant distressed properties in the City. Each of the following sections will describe in greater detail how the numbers in this column were determined.

This analysis is not comprehensive and offers a conservative estimate of the costs of vacant properties in the City. Accordingly, only the direct costs of essential services (code enforcement, fire, and police) were calculated.<sup>3</sup> Demolition costs, while a significant expenditure, are not included in the calculation of service costs because they are not seen as a direct service cost for the purposes of this kind of analysis. Rather, demolition is considered an intervention strategy in which the City can choose to invest to decrease the costs imposed by vacancy. For further discussion, see Section 5 of this analysis. The spillover costs of vacant properties on commercial property values, and the effects of vacant commercial properties on residential values, were not estimated because there are no reliable studies available to generate such estimates. Only the effects of distressed residential properties on residential values are considered in this analysis.

This study is also conservative because, in each step of the analysis, estimates were calculated in a conservative fashion. For example, in the spillover estimates in Section 4, only spillover costs out to 500 feet from a distressed vacant property were considered, even though some research finds smaller effects out to 1,000 feet or more. Moreover, only the effects due to distressed vacant properties were included in the cost estimates in Section 4, despite the fact that even vacant properties in fair or good condition may have some (albeit smaller) negative impact on property values.

## A NOTE ON TIMING AND QUALITY OF THE DATA

Most of the analyses in this study were conducted using data primarily from calendar year 2015. One key exception is the Department of Permits, Licenses, and Inspection's (PLI) Division of Code Enforcement data, for which the analysis is based on three months of data running from August through October of 2016. Major changes in the PLI's Code Enforcement practices, including large increases in inspection volumes during the middle of 2016, meant that 2015 data would not provide a meaningful indicator of ongoing activity levels. In estimating service costs, figures from the 2016 City budget were used to reflect current City expenditure rates (salaries, fringe benefits, etc.).

In addition, the analysis in Section 1 that was used to generate a data set of vacant property in the City would ideally be unnecessary had a comprehensive survey assessing vacancy and building conditions been available. Accordingly, the Section 1 analysis was required in order to "build" a reliable data set of vacant properties on which to base the remaining estimations in this study. The resulting data set is therefore subject to the limitations of the data used to create it.

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<sup>3</sup> This study is not comprehensive and does not include some service costs that might be related to vacant properties in the City, like those costs related to legal and court costs for prosecuting housing and building codes or removing trash or debris dumped on vacant land.



# SECTION 1. GENERATING THE VACANT PROPERTY DATA SET

In order to identify vacant properties, two basic data sets were used to create a comprehensive Vacant Property Data Set. First, DCP had compiled, from various sources, a data set of properties that they call “Distressed Inventory.” These properties include vacant lots – both publicly and privately owned – as well as buildings owned by a variety of public entities, including the City, the URA, the Pittsburgh Public School District, the Port Authority of Allegheny County, Allegheny County, and others. This Distressed Inventory data set also includes condemned and tax delinquent properties. All of the properties in the Distressed Inventory are considered vacant properties, other than those that are classified only as tax delinquent, based on discussions with URA staff. (Some tax delinquent properties were also classified as vacant lots or as condemned, and these were retained in the new vacant property data set.)

Because many vacant structures in the City were unlikely to appear in the Distressed Inventory data set (especially many privately owned vacant structures), another source of data was needed to identify these properties. Ideally, a comprehensive vacancy/building condition survey would be used for this purpose. Because this was not available, the second data set relied upon to create the Vacant Property Data Set was address-level data on the vacancy status of mail addresses purchased from PolicyMap, which provided United States Postal Service (USPS) data on vacant addresses from Valassis, Inc., a vendor of USPS vacancy data.

## CLEANING THE USPS DATA

Data on USPS vacancy status was purchased for two points in time – the first quarter of 2015 and the third quarter of 2015. If an address was classified as vacant by the USPS at both of these points in time, it was considered vacant for the purpose here. This was to try to minimize the number of seasonal or short-term vacancies.

After cleaning out a large portion of the USPS addresses which were P.O. boxes, approximately 9,400 unique street addresses were represented in the USPS data. These were then merged via street number and name to parcel street addresses from a comprehensive data set of all parcels in the City provided by the URA. Additional spatial matching via ArcGIS picked up a small number of additional matches where there were small differences in the street name or number across the two data sets.<sup>4</sup> Overall, after data cleaning, the USPS data were used to

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<sup>4</sup> Only a small portion of USPS addresses that were not able to be matched by street number and name were spatially matched via GIS. The coordinates of the street addresses within 25 feet of the centroid of a parcel were identified. Then, for these matches, a visual comparison of the street addresses and the parcel addresses were compared. Only 32 additional matches (in addition to the 5,600+ matched via street number and name) were confirmed by this supplementary approach. Also, some USPS addresses associated with properties identified (via link to parcel data) as multitenant properties (e.g., multifamily 5+unit residential buildings) were deleted because there was no reasonable way to estimate if the property was predominantly vacant. However, a small number of the properties in the USPS data were also in DCP’s Distressed Inventory data set and are multifamily (5+ units) properties. These are included in the final “Vacant” data set produced here.



conservatively identify almost 5,700 likely vacant properties that were matched to parcels in the City. Table 1.2 breaks out these parcels by type of structure or vacant lot, per the parcel data set.

**Table 1.2. Vacant Properties Identified from USPS Vacancy Data**

Type of Structure/Land	Street Addresses/Structures/Lots
Detached single-family	1,478
Rowhouse and townhomes	333
2-4 unit structures <sup>5</sup>	1,219
Multifamily (5+ units) <sup>6</sup>	8
Commercial and industrial	953
Vacant land/lots	1,666
<b>Total</b>	<b>5,657</b>

Data sources: City parcel data set; USPS vacant address file (PolicyMap, Valassis)

## COMBINING THE DISTRESSED INVENTORY DATA SET AND USPS VACANCY DATA

The street addresses (which had been previously linked to parcel numbers) from the USPS data were then merged with the Distressed Inventory data set (after those parcels that were only tax delinquent were removed, as described above). Some addresses appeared in both the Distressed Inventory data set and the data set derived from the USPS vacancy data, as expected, and any duplicate addresses were eliminated. The resulting Vacant Property Data Set contains almost 24,000 vacant properties.

Table 1.2 breaks out these vacant properties. Of these nearly 24,000 vacant properties, 7,500 contain vacant structures while over 16,000 are vacant lots. Just over 6,000 (80 percent) of the vacant structures are residential. Approximately 78 percent of the vacant structures are privately owned, but only 34 percent of the vacant lots are privately owned.

Figure 1.1 plots the locations of vacant properties by type, with vacant residential parcels colored red, vacant nonresidential parcels colored green, and vacant lots colored black. Because the small size of most parcels makes it difficult to identify the spatial patterns of the different types of vacant properties, Figure 1.2 uses small colored dots (with each parcel = 1 dot) against a black background to illustrate the spatial patterns of the different types of vacant properties. These maps do not indicate the physical space consumed by the various types of vacant parcels.

<sup>5</sup> For vacant addresses in the USPS data, one-to-four unit properties were assumed vacant if at least one address was reported vacant in the USPS for two consecutive quarters. For two-unit properties, this equates to 50 percent vacancy over the six-month period. For 3-4 unit properties, the vacancy rate could be lower. However, three- and four-unit properties comprise less than 13 percent of one-to-four unit vacant structures here.

<sup>6</sup> These are properties that were also identified in DCP's Distressed Inventory file, per discussion in footnote 2.

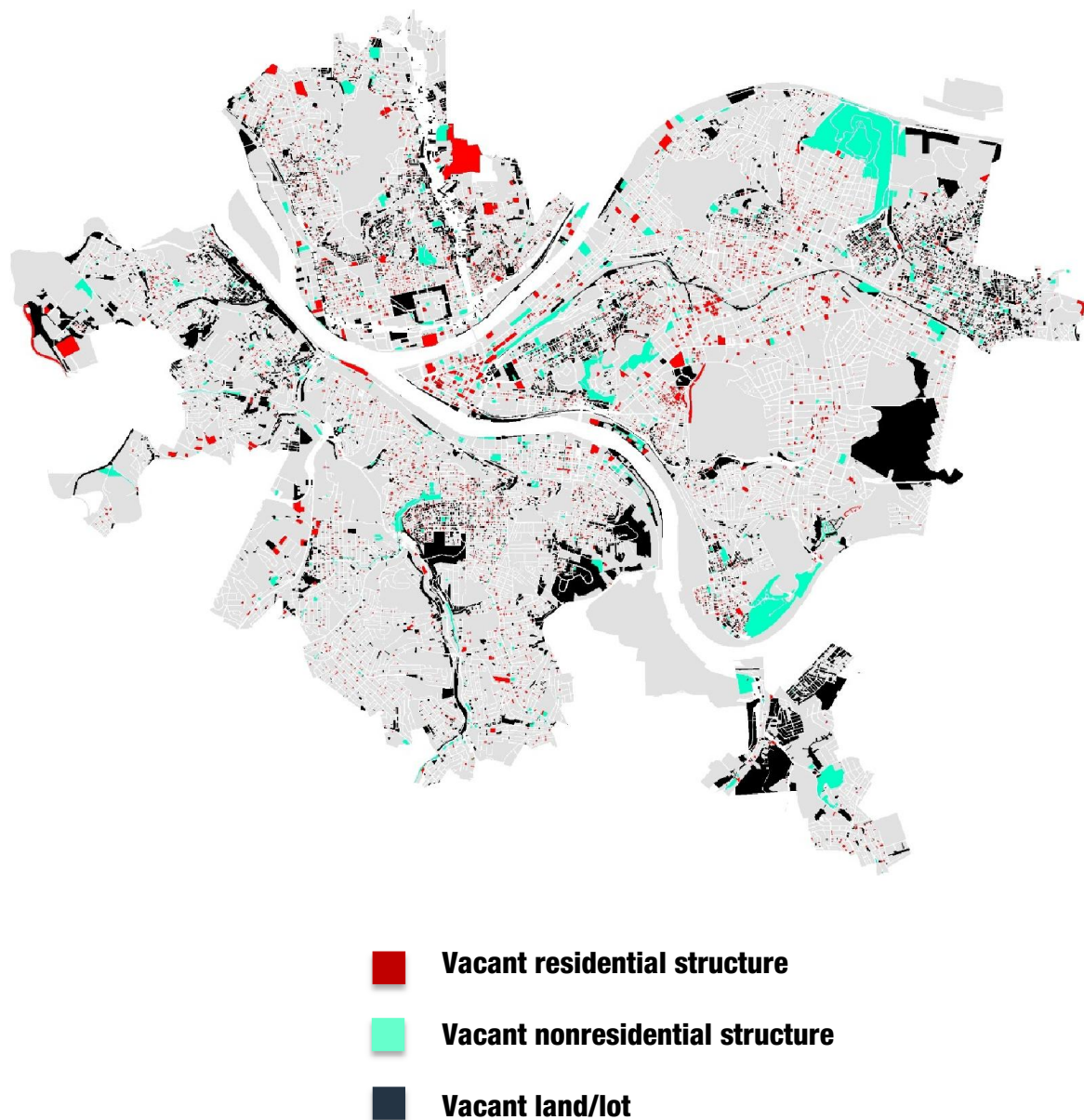
Rather, they are intended simply to illustrate more clearly the spatial distribution of the different types of vacant properties, by *count or frequency*, and not by geographical space consumed by the vacant parcels.

**Table 1.3. Vacant Properties Data Set**

Type of Property	Number of Properties
Public nonresidential vacant structure	660
Public residential vacant structure	1,003
Private nonresidential vacant structure	809
Private residential vacant structure	5,028
Private vacant lot	5,586
Public vacant lot	10,671
<b>Total</b>	<b>23,757</b>

Data sources: DCP Distressed Inventory file; USPS vacant address file (PolicyMap, Valassis); City parcel data set

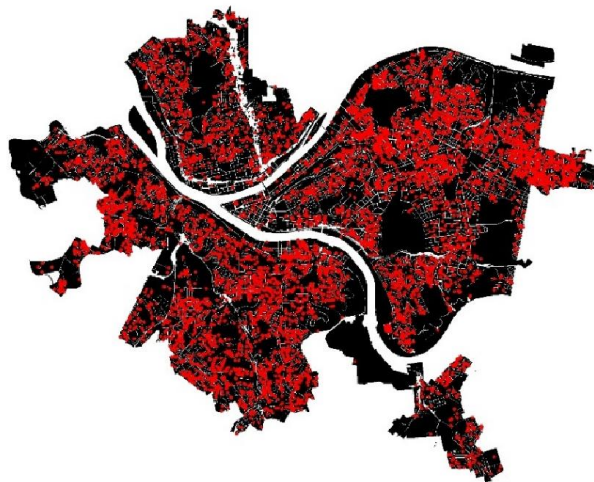
Figure 1.1. Map of the Vacant Property Data Set<sup>7</sup>



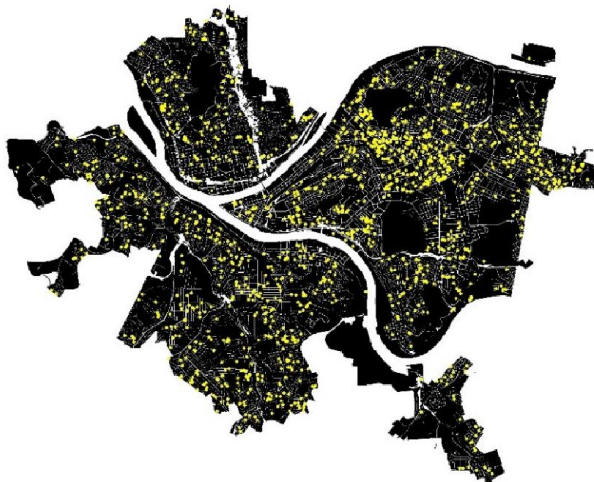
<sup>7</sup> A key point that Figure 1.1 highlights is that, either in the Distressed Inventory or in the USPS data, some parcels listed as “vacant” are in the public realm (e.g., Highland Park is shown as vacant on the map). As referenced in the Executive Summary, this is further indication that a comprehensive survey of vacancy and property condition in Pittsburgh would be a critical tool to ensuring that Pittsburgh fully understands the scope of the problem and has an accurate baseline by which it better measures progress.

Figure 1.2. Intensity Maps of Vacant Residential Structures, Vacant Nonresidential Structures, and Vacant Lots. (Color does not indicate spatial extent of vacancy, just frequency.)

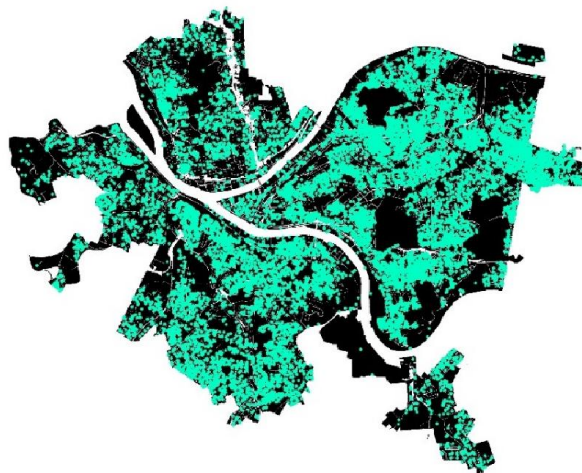
Vacant Residential  
Structures



Vacant  
Nonresidential  
Structures



Vacant Lots



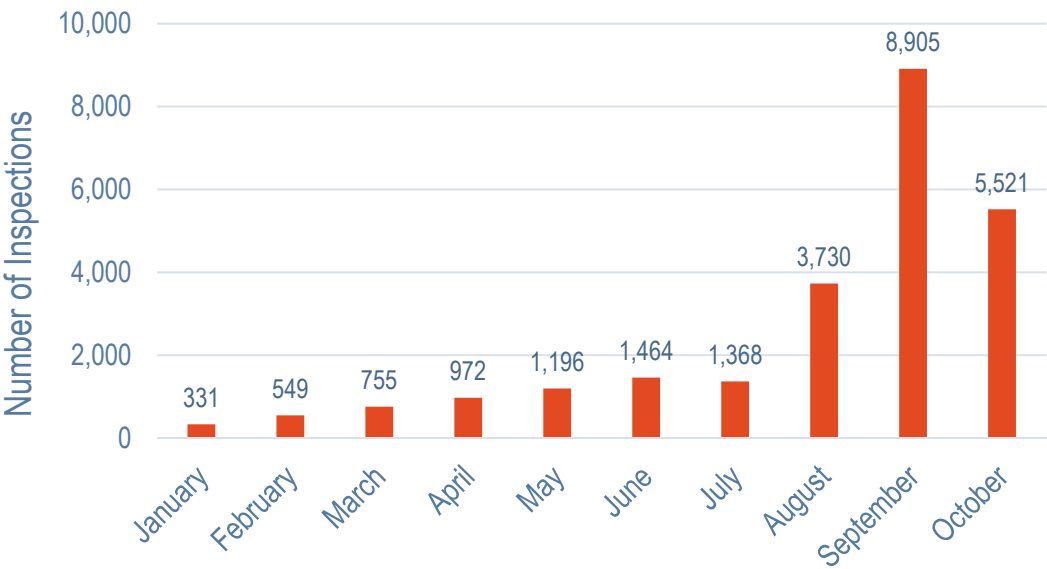
# SECTION 2. SERVICE COSTS: CODE ENFORCEMENT, POLICE, AND FIRE

The number of vacant properties highlighted in the Vacant Property Data Set was then used to calculate the costs of providing essential City services to vacant properties on an annual basis. The three City agencies tasked most often with providing services to and addressing problems associated with vacant properties are PLI's Division of Code Enforcement ("Code Enforcement"), the Bureau of Police ("Police"), and the Bureau of Fire ("Fire").

## 2.1. COST ESTIMATES FOR CODE ENFORCEMENT

In order to estimate Code Enforcement costs associated with vacant properties, data on inspections were obtained on inspections from PLI and then compared with PLI budget personal costs. Data were provided encompassing a period from very late in 2015 through October 31, 2016. However, Code Enforcement leadership pointed out that major, systematic changes had been made in Code Enforcement practices and activity during 2016 that were resulting in large increases in inspection activity. Indeed, the data provided show that inspection activity picked up markedly during the year, with gradual increases in spring and summer, but then very large increases in August through October, as shown in Figure 2.1.1. Code Enforcement leadership recommended using these last three months as an indicator of activity levels going forward. Thus, the analysis here utilizes only the three months of inspection activity from August 1, 2016 through October 31, 2016. However, to generate annual estimates of Code Enforcement costs, it annualizes the three-month activity by simply multiplying it by a factor of four.

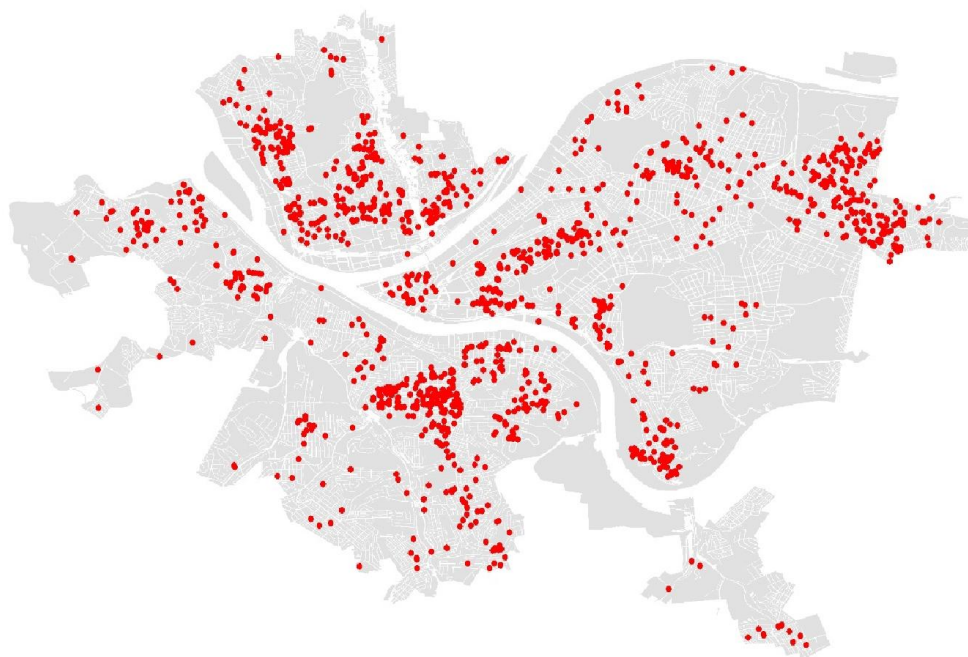
Figure 2.1.1. Actual Code Enforcement Inspection Counts from January 2016 through October 2016



During these last three months (August to October, 2016), there were a total of 18,156 Code Enforcement inspections. These inspections were then matched to the Vacant Property Data Set developed in Section 1 via parcel identification number. Of the 18,156 inspections over this period, 4,688 were associated with a vacant property. Because many inspections were conducted on the same properties, these 4,688 inspections occurred on 1,659 parcels. The locations of these parcels are illustrated in Figure 2.1.2



**Figure 2.1.2. Vacant Properties (Structures and Lots) with Code Enforcement Inspections, August through October, 2016**



In order to estimate annual Code Enforcement costs associated with vacant properties, the three-month (August-October) sample of inspections on vacant properties was increased by a factor of four to represent one year's worth of inspections. Table 2.1.1 estimates the number of inspections for different types of vacant structures and lots. This Table shows that vacant property inspections are expected to exceed 18,700 over a one year period. Of these expected inspections, just over 11,000 are inspections of vacant structures, with approximately another 7,500 inspections on vacant lots.

Code Enforcement estimates that each inspection takes a total of 20 minutes door-to-door. Based on this average time, Table 2.1.1 also provides an estimate of annual hours devoted to Code Enforcement inspections for each type of vacant property. Just over 6,200 hours are expected to be devoted to Code Enforcement on vacant properties over a one-year period, with approximately 3,700 of these hours associated with vacant structures and 2,500 associated with vacant lots.

**Table 2.1.1. Estimated Annual Inspections (from August 2016 forward) Associated with Vacant Properties**

Property Type	Number of Inspections, Annualized*	Total Hours, Annualized*
Public nonresidential vacant structure	312	104
Public residential vacant structure	1,528	509
Private nonresidential vacant structure	1,432	477
Private residential vacant structure	7,968	2,656
Private vacant lot	6,072	2,024
Public vacant lot	1,440	480
<b>Total Inspections Associated with Vacant Properties</b>	<b>18,752</b>	<b>6,251</b>

\*These figures are based on actual inspections from August 1, 2016 through October 31, 2016. Annualized figures are simply the actual figures multiplied by four. No adjustments have been made for any potential variation in activity during the year.

In order to estimate annual costs associated with Code Enforcement concerning vacant properties, hourly costs are estimated for Code Enforcement inspections. First, annual salaries for Code Enforcement inspectors are estimated at \$42,956, based on the PLI's 2016 budget figures.<sup>8</sup> Again, based on the 2016 PLI budget, fringe benefits are calculated at 30.8% of salaries, yielding a salary plus fringe rate of \$56,194 per year for Code Enforcement inspectors. This rate is applied to the estimated inspection time yielding the direct salary plus fringe benefit costs in the second column of Table 2.1.2. However, these figures do not account for administrative and supervisory personnel costs associated with the direct code enforcement personnel nor other non-personnel costs. Based on an analysis of the PLI budget, an indirect cost charge was developed for these costs. Applying this additional cost charge, yields the fully loaded costs indicated in the right-hand-most column of Table 2.1.2.<sup>9</sup>

**Table 2.1.2. Annual Code Enforcement Cost Estimates for Vacant Properties**

Property Type	Estimated Inspection Time (Total Hours)	Direct Salary + Fringe Costs	Fully Loaded Costs
Public nonresidential vacant structure	104	\$2,922	\$4,098
Public residential vacant structure	509	\$14,311	\$20,069
Private nonresidential vacant structure	477	\$13,412	\$18,808
Private residential vacant structure	2,656	\$74,625	\$104,652
Total associated with vacant/distressed structures	3,747	\$105,269	\$147,627
Private vacant lot	2,024	\$56,868	\$79,750
Public vacant lot	480	\$13,486	\$18,913
Total associated with vacant lots	2,504	\$70,354	\$98,663
<b>Total</b>	<b>6,251</b>	<b>\$175,624</b>	<b>\$246,290</b>

<sup>8</sup> This is based on a weighted average of "operations inspectors" and "building/fire demo inspectors" at a ratio of 17 to 3, per correspondence from Code Enforcement.

<sup>9</sup> Direct staffing costs were loaded by a factor of 24.5 percent, based on the ratio of total salaries to line salaries (i.e., not administrative or support positions). Then an additional loading for non-personnel costs of 12.6 percent was applied. These two combine for an overall loading factor of 40.2 percent.



Table 2.1.2 shows that Code Enforcement inspection costs for all types of vacant properties are estimated at approximately \$250,000 per year, assuming a 20-minute door-to-door inspection time. Of this cost, approximately \$150,000 is associated with vacant structures, with another almost \$100,000 associated with vacant lots. The bulk of Code Enforcement costs, both for structures and lots, are associated with privately owned vacant properties.

## 2.2. COST ESTIMATES FOR BUREAU OF POLICE DISPATCHES ASSOCIATED WITH VACANT PROPERTIES

In order to calculate the annual cost of Police services related to vacant property, data on 911 calls for the year 2015 were obtained by the URA. This data was used to calculate the number of Police hours spent responding to calls associated with vacant properties. The estimates of Police hours were then applied to 2016 Police budget information to calculate the cost.

### CALCULATING POLICE TIME DEDICATED TO VACANT PROPERTIES

The 911 data provided included the date and time of the beginning and end of each 911 dispatch.<sup>10</sup> From these variables, the length of the dispatch was calculated. Dispatches of less than 10 minutes were discarded, leaving 28,250 calls.

For a substantial number of calls (about 20 percent), the duration of the dispatch exceeded 24 hours, but these typically appeared to be due to incorrect dates. For these calls, the dispatch duration was set to 45 minutes, which is the median duration of calls with dispatch times under 24 hours.

These calls were then joined spatially to parcels using ArcGIS. Of these 28,250 911 dispatches, just over 5,000 were not associated with a street address, so could not be linked to a parcel. The remainder were linked to 13,600 property addresses and corresponding parcel numbers (many properties were associated with multiple dispatches during the year). Table 2.2.1 identifies the dispatches and their durations by type of property, with categories from the Vacant Properties file generated in Section 1.

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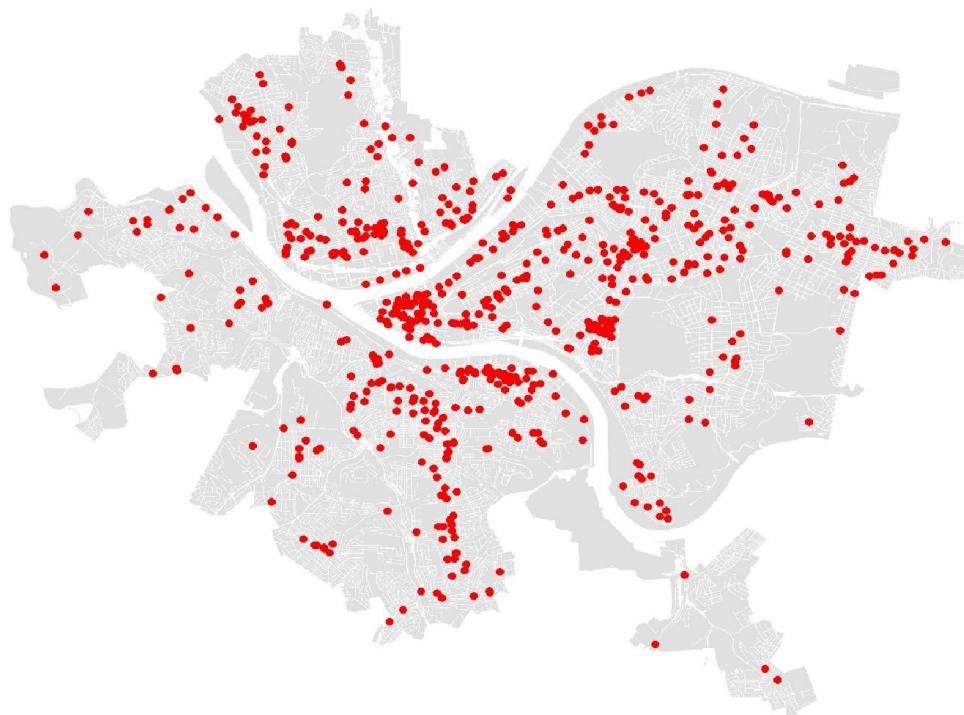
<sup>10</sup> In this context, a dispatch is a response to a 911 call. More than one unit (police officer) may respond to a single dispatch.

**Table 2.2.1. 911 Dispatches over 10 minutes in Duration Associated with Vacant Properties, 2015**

Property Type	Number of Dispatches	Total Hours	Mean Hours	Median Hours
Public nonresidential vacant structure	419	2,199	5.25	1.00
Public residential vacant structure	58	184	3.17	0.75
Private nonresidential vacant structure	262	1,224	4.67	1.00
Private residential vacant structure	1,707	7,416	4.34	0.75
Private vacant lot	29	148	5.09	0.75
Public vacant lot	557	2,337	4.20	0.75
<b>Total dispatches associated with vacant structures/lots</b>	<b>3,032</b>	<b>13,508</b>	<b>4.46</b>	<b>0.75</b>

There were just over 3,000 dispatches of over 10 minutes associated with 779 vacant structures or lots in 2015. The locations of these properties are plotted in Figure 2.2.1. Of these, approximately 2,400 were associated with vacant structures, and almost 600 were associated with vacant lots. Vacant structures accounted for just over 11,000 direct hours of dispatch time associated with these dispatches, with vacant lots accounting for another 2,400+ hours, leading to just over 13,500 hours of dispatch time. Because 2015 dispatches averaged 1.79 units per dispatch, these 13,500 hours of dispatch time are estimated to have utilized 24,165 hours of officer time.

**Figure 2.2.1. Locations of Dispatches over 10 minutes Associated with Vacant Properties, 2015**



## **APPLYING POLICE TIME TO DETERMINE THE SERVICE COSTS ASSOCIATED WITH VACANT PROPERTIES**

Table 2.2.2 estimates the costs associated with these dispatches. Data on police dispatches for 2015 were examined, and the average number of officers (units) per call was 1.79. Thus, each hour of dispatch time is assumed to cost 1.79 hours of police officer time. Hourly salary and fringe benefit costs are based on the City's 2016 budget figures. The average officer salary is \$60,847, and fringe benefits are added at a rate of 18.6%, leading to an hourly direct labor cost of \$72,171.<sup>11</sup> The second column in Table 2.2.2 shows the direct salary and fringe costs of the dispatch time associated with each type of property. However, this figure does not account for the associated supervisory and administrative staff costs, nor does it account for other indirect costs (e.g., vehicles, professional services, supplies, etc.). Therefore, an indirect cost charge was calculated and applied to estimate "fully loaded" costs, shown in the third column in Table 2.2.2.<sup>12</sup>

Table 2.2.2 shows that 911 dispatches associated with vacant/distressed properties account for an estimated \$1,126,566 in police services costs annually. Of this amount, \$919,317 is

<sup>11</sup> Average field officer salary is calculated as a weighted average of officer salaries ranging from Officer First Year to Master Police Officer in the 2016 BOP budget. The fringe rate is simply the ratio of total fringe benefit costs to total salaries for the department from the 2016 department budget.

<sup>12</sup> Direct staffing costs were loaded by a factor of 20.5 percent, based on the ratio of total salaries to line salaries (i.e., not administrative or support positions). Then an additional loading for nonpersonnel costs of 7.1 percent was applied. These two combine for an overall loading factor of 29.1 percent.

associated with vacant structures, and \$207,249 is associated with vacant lots. While a large majority of the costs associated with vacant structures is due to privately owned properties, a large majority of the costs associated with vacant lots is due to publicly owned properties.

**Table 2.2.2. Annual Police Service Cost Estimates for 911 Dispatches to Vacant Properties\***

Property Type	Dispatch Time (Total Hours)	Direct Salary + Fringe Costs	Fully Loaded Costs
Public nonresidential vacant structure	2,199	\$142,040	\$183,396
Public residential vacant structure	184	\$11,885	\$15,346
Private nonresidential vacant structure	1,224	\$79,062	\$102,081
Private residential vacant structure	7,416	\$479,020	\$618,494
Total associated with vacant/distressed structures	11,023	\$712,006	\$919,317
Private vacant lot	148	\$9,560	\$12,343
Public vacant lot	2,337	\$150,953	\$194,906
Total associated with vacant lots	2,485	\$160,513	\$207,249
<b>Total</b>	<b>13,508</b>	<b>\$872,519</b>	<b>\$1,126,566</b>

\*Based on 2015 911 call activity, but uses 2016 police budget costs for salary, etc.

## 2.3. COST ESTIMATES FOR BUREAU OF FIRE SERVICES ASSOCIATED WITH VACANT PROPERTIES

In order to estimate fire service costs associated with vacant properties, data on 2015 fire dispatches were obtained by the URA from the Bureau of Fire (Fire). The dispatch data revealed the number of personnel and equipment sent to respond to each dispatch as well as an estimate of the number of hours associated with dispatches to vacant properties. This information was then used to calculate the total costs.

### CALCULATING FIRE TIME AND RESOURCES DEDICATED TO VACANT PROPERTY

Data were provided on a dispatch-unit level, so that each unit dispatched was a separate record/row in the data file.<sup>13</sup> Incident numbers were included so that dispatched units could be linked by incident.<sup>14</sup> In total, more than 56,000 units were dispatched in 2015. However, many

<sup>13</sup> In the context of the Fire analysis, a "unit" is a fire engine, a fire vehicle, etc., together with associated personnel. Units are identified by type, and then are associated with hourly costs, which are comprised of apparatus (e.g., vehicle) costs and associated personnel costs.

<sup>14</sup> An "incident" in this context refers to a fire or similar event to which the Fire department would respond. For each incident, several units may be dispatched.

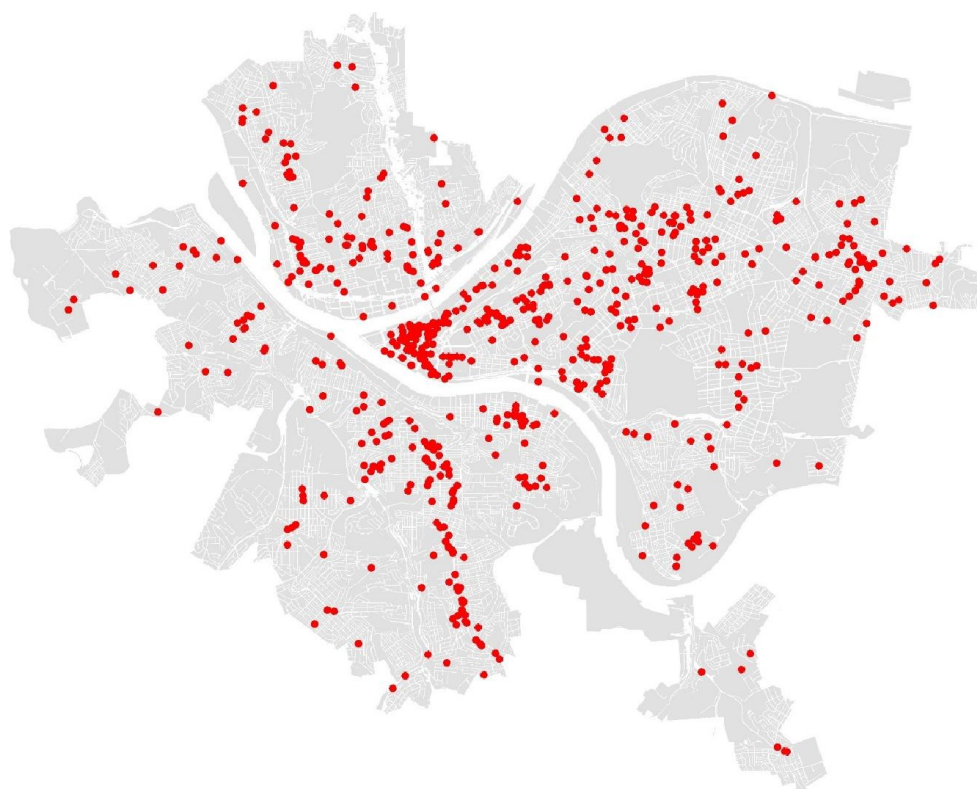
of these dispatches were very brief, with many units dispatched for less than 10 minutes. These 56,000 dispatches were associated with just over 14,000 unique street addresses (although many of these addresses were merely intersections or street locations, and not specific property addresses).

In order to identify the dispatches associated with vacant properties (including both vacant structures and vacant lots), the dispatch data was linked to parcel data to the extent possible. However, many dispatches were not clearly associated with specific parcels, but rather simply indicated street locations or intersections. These incidents were not linked to specific parcels and so could not be connected to vacant properties.

Two basic methods were used to link fire incidents to properties (and thereby parcel numbers). First, street addresses in the Fire data were matched to street addresses from the comprehensive data set of all parcels in the City provided by the URA, which was also used to clean the USPS vacancy data set, referred to in Section 1. This approach was used for more than 5,700 of the addresses in the Fire data. Then, to address the likelihood of small discrepancies in street addresses before the two data sets, a second approach was utilized for the remaining Fire addresses. The second approach uses ArcGIS spatial joining to identify parcels that were close to or contained the point coordinates of the Fire addresses, and then looked for similar street names and street numbers. Finally, visual inspection of potential matches was used to confirm the likely match. This second method yielded just over an additional 3,000 matches between Fire addresses and parcel digest addresses. Overall, just over 8,700 of the street addresses in the Fire data were able to be linked to parcel numbers. This allowed for parcel IDs to be attached to many of the dispatch records in the Fire dispatch data set. These 8,700 addresses, which were linked to parcel identification numbers, were associated with almost 37,000 of the 56,000 dispatches during 2015.

Once this was done, data on the type of vacant parcels could be merged into the Fire dispatch data to identify dispatches and incidents that were associated with vacant properties. Of the almost 37,000 dispatches linked to specific properties during 2015, just over 5,800 of them were associated with vacant structures or vacant lots. These dispatches were associated with over 1,900 fire incidents involving 653 unique vacant structures and lots. Figure 2.3.1 illustrates the locations of these 653 vacant properties. Table 2.3.1 indicates the number of incidents and the number of dispatched units for each type of vacant property.

**Figure 2.3.1. Locations of Vacant Structures and Lots Associated with One or More Fire Dispatches in 2015**



**Table 2.3.1. Fire Incidents and Dispatched Units Associated with Vacant Properties, 2015**

Property Type	Number of Incidents	Number of Dispatched Units	Average Units per Incident
Public nonresidential vacant structure	394	918	2.3
Public residential vacant structure	27	80	3.0
Private nonresidential vacant structure	184	434	2.4
Private residential vacant structure	1,216	3,956	3.3
Total associated with vacant/distressed structures	1,821	5,388	3.0
Private vacant lot	31	64	2.1
Public vacant lot	90	369	4.1
Total associated with vacant lots	121	433	3.6
<b>Total</b>	<b>1,942</b>	<b>5,821</b>	<b>3.0</b>

## APPLYING FIRE TIME AND RESOURCES TO DETERMINE THE SERVICE COSTS ASSOCIATED WITH VACANT PROPERTIES

The Bureau of Fire provided hourly costs for salary and apparatus (e.g., fire trucks, vehicles, etc.) use for the different types of units employed. The dispatch records were associated with particular types of units so these costs could be associated with each dispatch. However, these costs did not include fringe benefits or indirect costs for administrative and support staff or for nonpersonnel costs. Therefore, based on the Fire budget for 2016, loading factors were calculated for fringe benefits, administrative and support costs, and nonpersonnel costs. Together, these three loading factors constituted an overall loading factor of 36.2 percent, which was applied to the salary portion of the hourly cost figures.<sup>15</sup> Then, these fully loaded hourly costs were multiplied by the duration of the dispatch to calculate the total cost of the unit being dispatched. Then, these charges were aggregated by incident and broken out by type of property.

Table 2.3.2 provides the costs associated with each type of vacant property. Overall, the 1,942 fire incidents in 2015 associated with vacant properties account for an estimated cost of \$580,025, based on 2016 hourly cost figures. Of this amount the bulk (\$552,628) was associated with vacant structures, with the largest component (\$360,554) associated with privately owned vacant residential structures.

**Table 2.3.2. Direct and Total Annual Fire Service Costs Associated with Vacant Properties**

Property Type	Number of Incidents	Salary + Apparatus	Fully Loaded Costs
Public nonresidential vacant structure	394	\$78,957	\$88,706
Public residential vacant structure	27	\$12,793	\$13,579
Private nonresidential vacant structure	184	\$80,426	\$89,790
Private residential vacant structure	1,216	\$323,099	\$360,554
Total associated with vacant structures	1,821	\$495,275	\$552,628
Private vacant lot	31	\$6,891	\$7,470
Public vacant lot	90	\$17,530	\$19,928
Total associated with vacant lots	121	\$24,421	\$27,397
<b>Total</b>	<b>1,942</b>	<b>\$519,697</b>	<b>\$580,025</b>

<sup>15</sup> The 36.2 percent loading factor was derived from a fringe benefit rate of 15.9%, an administrative and support loading factor of 13.95%, and a nonpersonnel loading factor of 3.1%. These were all based on calculations on the 2016 Fire budget.



# SECTION 3. ESTIMATED ANNUAL LOST PROPERTY TAXES DUE TO TAX DELINQUENT, VACANT PROPERTIES

One of the primary ways in which cities fund code enforcement, police, and fire services are through the collection of property taxes. Unfortunately, one of the most common traits associated with vacant properties throughout the country is the nonpayment of property taxes. Accordingly, many vacant properties in Pittsburgh are tax delinquent. To provide for a conservative estimate of lost tax revenue due to these properties, a file of tax delinquent parcels was obtained from the URA, dated as of March, 2016. Only properties that were considered “long-term tax delinquent,” meaning those properties that were three or more years delinquent, were included in this calculation of tax delinquency.<sup>16</sup> To estimate the annual, ongoing loss in tax revenue for these properties, the total principal tax owed was divided by the number of years of arrearage. Over 5,800 of the vacant properties in the Vacant Property Data Set had arrearages of 3 or more years.

Then these annualized delinquencies were merged into the Vacant Property file from Section 1, and annual lost taxes were calculated for each type of vacant property. Table 3.1 provides these results.

**Table 3.1 Long-term Tax Delinquent, Vacant Properties, Estimated Annualized Delinquency**

Property Type	Number of Properties	Total Annualized Tax Bill	Average Annualized Tax Bill	Median Annualized Tax Bill
Public nonresidential vacant structure	1	\$78	\$78	\$78
Public residential vacant structure	1	\$43	\$43	\$43
Private nonresidential vacant structure	308	\$708,519	\$2,300	\$1,489
Private residential vacant structure	921	\$537,651	\$584	\$521
Total associated with vacant structures	1231	\$1,246,291	\$3,005	\$2,131
Private vacant lot	4,654	\$1,084,265	\$233	\$156
Public vacant lot	8	\$7,649	\$956	\$419
Total associated with vacant lots	8	\$7,649	\$956	\$419
<b>Total</b>	<b>5,893</b>	<b>\$2,338,206</b>	<b>\$397</b>	<b>\$215</b>

<sup>16</sup> In Pittsburgh, properties that are tax delinquent for two or more years are subject to foreclosure. However, properties that are only one or two years tax delinquent were considered “short-term” delinquent for this conservative study because those delinquencies were considered much more likely to be repaid by current property owners.



# SECTION 4. ESTIMATING THE SPILLOVER COSTS OF DISTRESSED VACANT RESIDENTIAL PROPERTIES ON RESIDENTIAL PROPERTY VALUES AND PROPERTY TAX REVENUE IN PITTSBURGH

The previous sections demonstrated the significance of the costs imposed by all vacant properties contained in the Vacant Property Data Set. It is likely, however, that a significant percentage of the estimated costs from the previous sections are expended on just those vacant properties that are in poor physical condition, or, as they are referred to in this analysis, distressed vacant properties. For this fourth part of the study, the costs that are imposed upon neighborhoods and taxpayers in the form of reduced property values and the associated decline in property tax revenue are estimated as they relate to distressed vacant properties, and not simply vacant properties.<sup>17</sup> These costs are typically referred to as “spillover” costs in the research literature.

The approach here is to utilize the findings of several recent studies, combined with local data on distressed vacant properties in Pittsburgh, to develop estimates of these spillover costs. The data and time required to directly measure the percentage effect of vacant properties on nearby property values using primary real estate data is quite substantial, and any particular measurement of such effects is subject to the limits of the available data. The approach used here takes advantage of a now substantial literature on the effect of vacant and distressed properties on property values. This study uses a meta-analysis of the high-quality studies that have been done across different cities and different years, and estimates the spillover costs on nearby property values due to distressed vacant properties, using the central tendencies of these findings.

Then, City data on distressed vacant properties are combined with these spillover effect percentages from the existing literature to estimate the cumulative effects of distressed vacant properties in Pittsburgh on residential property values. These, in turn, are used to estimate

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<sup>17</sup> Vacant properties that are not in distressed condition are much less likely to impose spillover costs on nearby properties. They still can impose spillover and tax delinquency costs. Hence, costs associated with vacant, but not distressed, properties are included in Sections 2 and 3, but not in Section 4.

property tax revenue effects. Sensitivity analysis is performed using especially conservative estimates from the literature in order to develop a lower bound on the likely property value impacts.

## WHAT DO EXISTING STUDIES SAY ABOUT THE EFFECT OF VACANT PROPERTIES ON NEARBY HOME VALUES?

A good deal of research has examined the spillover costs of various types of distressed housing on nearby residential property values, including the effects of foreclosed properties, the effects of vacant properties, and the effects of tax delinquent properties. The precise definitions of vacancy, foreclosure, blight, distress, and tax delinquency vary across studies due to the nature of the data available and differences in local definitions of these terms.<sup>18</sup> In recent years, the greatest volume of such work has concerned the impact of foreclosures on nearby home values. However, while foreclosures may catalyze an increase in vacant or physically neglected homes, most of these studies do not directly measure the impact of the vacancy or physical condition on nearby home values. (A few of these studies do separately measure the impact of vacant, mortgage-distressed properties, and they are considered here.)

The focus here is on studies that measure the effect of different sorts of vacant, residential structures on nearby home values. While many “cost of blight” studies claim to include the spillover costs of vacancy or blighted properties on nearby home values, a set of 8 studies conducted over the last 10 years were identified that were viewed as sufficiently strong to include in this meta-analysis of spillover impacts.

Not surprisingly, some of the studies examined here occurred in the same cities. This is partly because some cities have developed better sets of data on distressed properties, home values, and other relevant information that are needed to conduct strong studies. While the precise magnitudes of the spillover costs are expected to vary somewhat based on the location of the study, the generally consistent findings among the studies and the studies in other cities suggest that these effects are similar across different types of cities. Moreover, one of the studies is carried out across fifteen metropolitan areas.<sup>19</sup>

For the purposes here, the key finding of interest in these other studies is the extent to which nearby distressed vacant structures affect home values. The studies generally measure the degree to which a distressed property within a certain radius of a home reduces the value of the home. The radii at which these analyses are done tend to range between 250 and 1,000 feet, with all of the strong studies identified here including a measurement in the range of 500 to 660 feet (about 1/10<sup>th</sup> to 1/8<sup>th</sup> of a mile). While some studies find negative effects as far out as 1,000 feet or more, the effects tend to get quite small beyond the 500-660-foot distance. Thus, any spillover costs estimated in this analysis will be conservatively measured by ignoring effects

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<sup>18</sup> No significant literature has examined the effect of vacant nonresidential property on home values, or the effect of vacant properties on nonresidential values. Thus, any such effects are not accounted for in this study.

<sup>19</sup> Most of these studies occur within one city or one county because the sort of data required on vacant properties is often highly localized and not generally available across counties or metropolitan areas in a consistent fashion.

beyond 500 feet. For simplicity, we will consider all estimates in the 500-660 foot range as 500-foot estimates, another conservative assumption.

Table 4.1 summarizes the spillover estimates from the eight strong studies identified. These studies used strong econometric methods to identify the magnitudes of spillover costs. Most of them used what are called “spatial hedonic” methods, using advanced econometric methods to control for differences among properties and property locations other than the number of nearby distressed properties. These studies control for differences in the size, type of structure, number of bathrooms and bedrooms, and other quality characteristics among different houses. They also control for differences in neighborhood and location characteristics. Some used a hybrid hedonic method utilizing the change in sale price as the dependent variable (“repeat sales”).<sup>20</sup> While no study is perfect, the studies here go to significant lengths to isolate the spillover costs of distressed properties to the greatest extent possible using high-quality and detailed data.

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<sup>20</sup> The studies utilizing hybrid repeat sales approaches include Han (2014) and Gerardi et al. (2012). The repeat sales approach suffers from potential bias due to a lack of information on improvements to properties between subsequent sales (the Han study attempts to omit properties that may have been “flipped” but may be limited in its ability to do so). The spatial hedonic methods suffer from potential omitted variable bias as well, although of a different sort, although the small-area spatial controls minimize this problem.

**Table 4.1. Findings on Negative Spillover Price Effects within 500 Feet of Distressed Residential Structures in Urban Markets, 2007-2016 (1)**

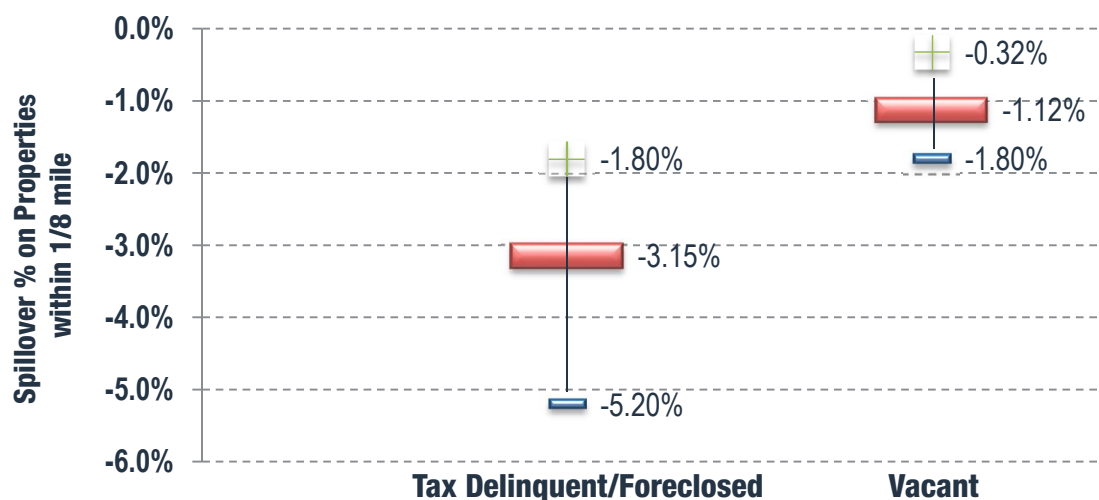
Effects out to 500 feet					
	City	Tax Foreclosed or Delinquent		Vacant	
Whitaker & Fitzpatrick, 2014	Cleveland	-5.20%			
Alm et al., 2014	Chicago	-3.40%			
Griswold and Norris, 2007	Cleveland	-2.26%			
Whitaker & Fitzpatrick, 2013	Cleveland	-1.80%		-1.80%	
Griswold et al. 2014	Cleveland	-3.07%	(2)	-0.83%	(2)
Mikelbank, 2008	Columbus			-1.35%	(3)
Han, 2014	Baltimore			-0.32%	(3)
Gerardi et al., 2012	15 Metros			-1.30%	(4)
Mean		-3.15%		-1.12%	
Range		-1.8% to -5.2%		-0.32% to -1.8%	

Notes:

- (1) A few of these findings are actually measured out to distances of 660 feet, so that the effects here are conservative estimates at 500 feet.
- (2) These factors are averages of the effects found in 3 of the 4 submarkets used in this study: extremely weak, weak, and moderately functioning; these are the sorts of neighborhoods where most tax delinquent properties tend to exist. The effect in highly functioning markets is substantially larger in magnitude (more negative) and is excluded here for the sake of being conservative in estimating spillover costs.
- (3) This is a spatially weighted average of the magnitude of the effect found within 250 feet and that found from 251 to 500 feet. The 250-foot effect is given ¼ weight, and the 251-500-foot effect is given ¾ weight, reflecting the difference in spatial areas surrounding the distressed property.
- (4) This is an average of the magnitude of the effect found for vacant homes with seriously delinquent mortgages and lender-owned homes in below-average condition

Table 4.1 distinguishes findings across the eight studies between those pertaining to vacant properties and those pertaining tax delinquent or tax foreclosed properties, with this latter category often representing primarily vacant properties. Tax delinquent or tax foreclosed vacant properties are expected to be, on average, more distressed than the average vacant, non-delinquent property, because owners of vacant properties who are current on their taxes are more likely to maintain the properties. Conversely, tax delinquent owners may be more likely to abandon their properties. Figure 4.1 illustrates the range of these spillover costs at 500 feet.

**Figure 4.1. Range of Negative Spillover costs (as % of Property Value) to 1/8 mile**



For vacant (non-tax delinquent) properties the spillover effects range from -0.32 percent in one study to -1.8 percent, with an average of -1.12%. For tax foreclosed or delinquent properties, the spillover effects range from -1.8 percent to -5.2 percent, with a mean of -3.15 percent. Thus, tax delinquent or tax foreclosed properties have a markedly larger, negative effect on nearby property values, which is expected because these properties, on average, are more likely to be physically distressed. The distressed, vacant properties identified in this study are likely to have an impact on residential home values similar to that of tax delinquent properties in the literature.

These ranges of impact discussed in the preceding paragraph are conservative in at least two ways. First, as explained above, some studies find negative effects of vacancy or neglect beyond the 500-foot radius. But these measures are less common and the magnitudes are quite small, so while they may be material in nature (especially because more properties lie within 1,000 feet of a vacant structure than within the 500-foot radius), they are not counted for the sake of reliability and being conservative in estimates of spillover costs. Second, some of the largest estimates of negative impact (in the Griswold et al. 2014 study) were not included in the meta-analysis here due to their occurring only in “highly functioning” (that is lower-poverty and higher-property-value) neighborhoods. Because most distressed properties are located in lower-income and lower-value neighborhoods, including such large-magnitude spillover measures here would not be appropriate and would risk overestimating the spillover costs of blight.

In this analysis, GIS techniques are used to identify the number of distressed vacant properties that lie within 500 feet of each home in Pittsburgh. Then, using the spillover effect estimates and the assessed values of the homes (from the 2012 Allegheny County data provided by the URA) the decrease in values of all homes within 500 feet of a vacant home will be calculated and summed. This will yield the aggregate decreases in value due to distressed vacant properties.

Then, using estimates of assessed value and millage rates for the City from Allegheny County, losses in marginal tax revenue are estimated.

In order to provide for a very conservative, lower bound estimate for the magnitude of the spillover costs, the spillover costs are estimated using two different magnitudes of spillover cost effects, one using the “best reasonable” estimate of a -3.15% effect on price for every distressed, vacant residential property within 500 feet (up to a maximum of 5 distressed properties, as explained below), and one using the -1.12% effect size.

## **IDENTIFYING THE NUMBER OF VACANT PROPERTIES WITHIN 500 FEET OF HOMES IN PITTSBURGH**

In order to identify the number of distressed vacant residential properties within 500 feet of residential properties, data were utilized from the Vacant Properties Data Set developed in Section 1. The Vacant Properties Data Set includes condition information on many residential properties from Allegheny County. In addition, the Vacant Property Data Set also includes a field indicating whether a property is condemned. As a reminder, all vacant residential structures classified as in “Unsound,” “Very Poor,” or “Poor” condition by the County, or classified as condemned, are referred to as distressed vacant properties in this analysis. There are 1,370 such structures in the City.

The locations of these distressed vacant properties were plotted using their parcel numbers and a parcel map shape file provided by the City. Using ArcGIS, 500-foot buffers around each of the distressed vacant properties were calculated. These buffers are plotted against a parcel map for the City in Figure 4.2. Below this figure, Figure 4.3 plots residential property values throughout the City. By overlaying the buffers around the distressed vacant properties on top of the parcel data, which includes property values, we can identify how many distressed vacant properties lie within 500 feet of each residential property in the City, and then estimate negative impacts on those residential property values.

Table 4.2 shows the distribution of residential properties according to the number of distressed vacant properties that are within 500 feet. Just over one-half (52.6%) of properties have no distressed vacant properties within 500 feet. Another 35.7 percent have between 1 and 4 distressed vacant properties within a 500-foot radius. Finally, 11.7 percent of residential properties have 5 or more distressed vacant properties within 500 feet.

The literature reviewed suggests that the spillover costs of multiple nearby vacant properties on property values are not entirely linear. In particular, as more and more distressed vacant properties exist near a home, the negative effects on home value will eventually decline and reach a limit. For example, if having one distressed vacant property within 500 feet has a -3% effect on a home’s value, then having three such properties nearby may accumulate to a -9% cumulative effect. However, it is less likely that going from 3 nearby distressed vacant properties to 9 nearby distressed vacant properties will increase the effect by another threefold, from -9% to -27%. While the research on such nonlinear effects is somewhat scarce, some work in the

foreclosure literature suggests that these effects will tend to hit a plateau after reaching somewhere around 8 to 10 distressed vacant properties. To be conservative, the negative effects of distressed vacant properties are limited to 5. For example, if the effect of having one distressed vacant property within 500 feet is -3%, then the effect of having 5 is estimated as -15%, but the effect of having 6 is also estimated as -15%, as is the effect of having 10 distressed vacant properties within 500 feet.

**Figure 4.2. 500-foot Buffers Around Distressed, Vacant Residential Structures**

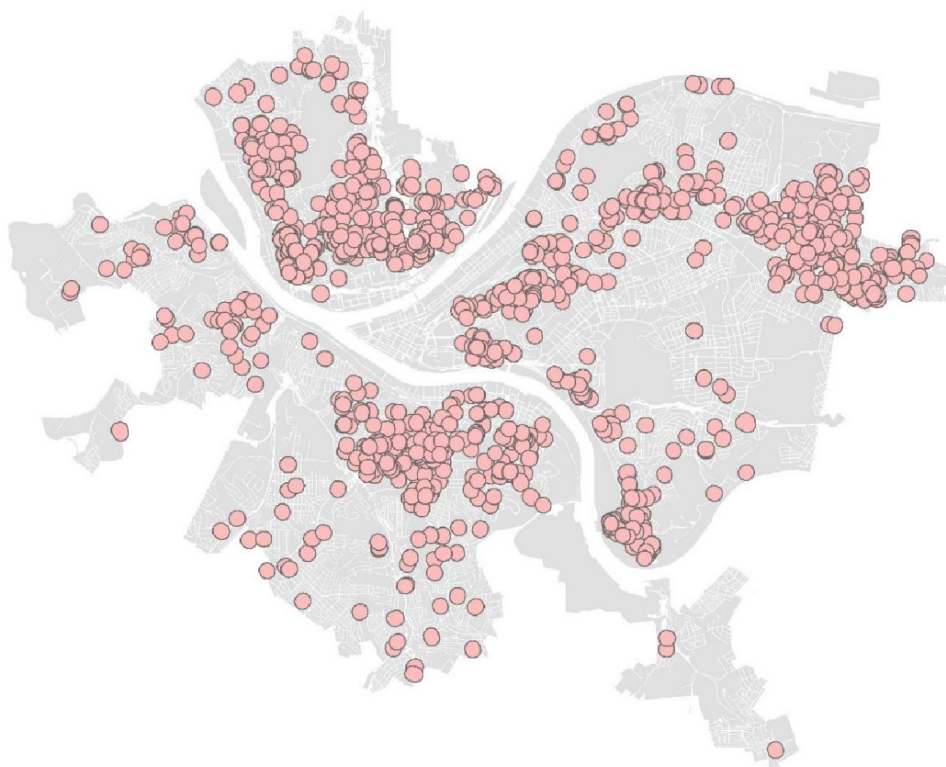




Figure 4.3. Tax-Assessed Values (land + building) for Residential Structures

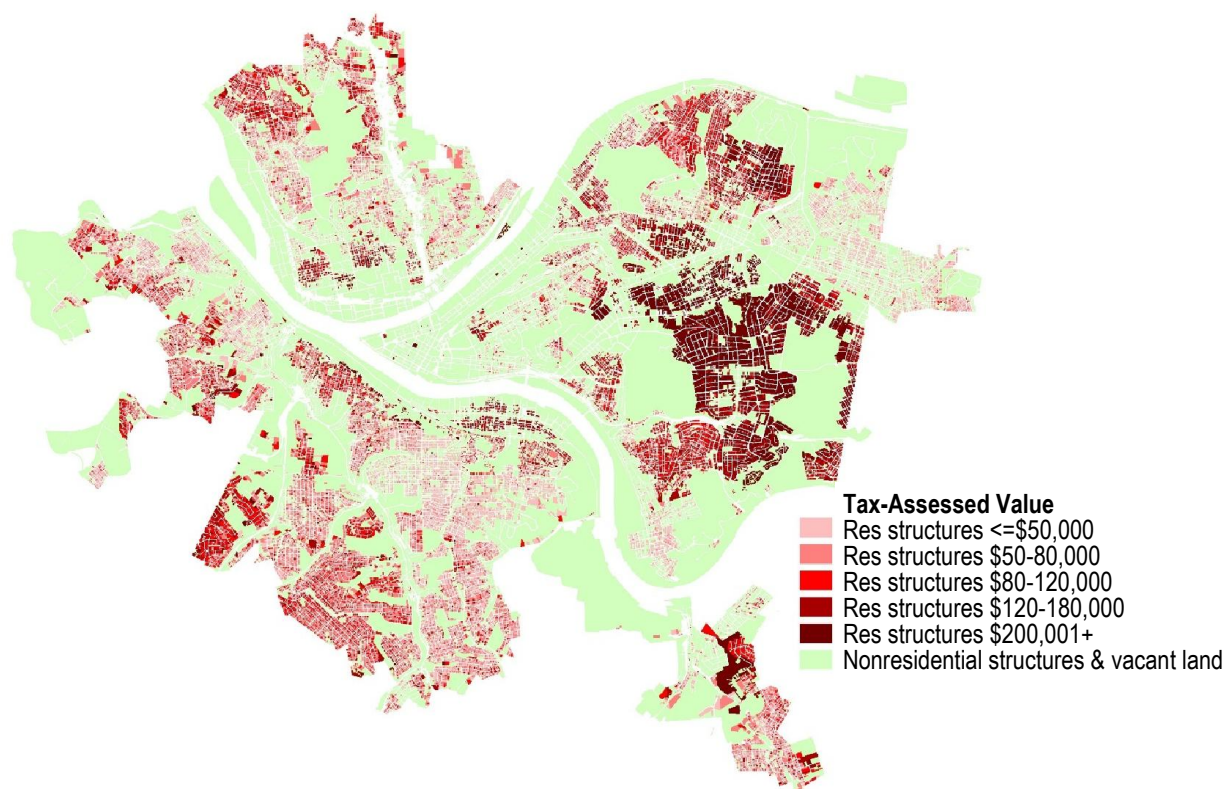


Table 4.2. Residential Properties by Number of Distressed Vacant Residential Buildings within 500 Feet, 2014-2015

Number of Distressed, Vacant Residential Properties within 500 ft	Number of Residential Properties	Percent of Residential Properties
0	50,762	52.60%
1	17,601	18.24%
2	8,779	9.10%
3	4,859	5.03%
4	3,264	3.38%
5+	11,249	11.66%
<b>Total</b>	<b>96,514</b>	<b>100.00%</b>



## SUMMING UP THE SPILLOVER COSTS ON RESIDENTIAL VALUES IN PITTSBURGH DUE TO DISTRESSED, VACANT RESIDENTIAL PROPERTIES

In order to estimate the cumulative impact of distressed vacant properties on housing values, the magnitude of the spillover effect (expressed as a percent of value per distressed vacant property within 500 feet, up to a limit of 5 vacant) must first be identified. To do this, we draw on the results of the meta-analysis summarized in Table 4.1 and Figure 4.1 above.

The first column in Table 4.3 presents, based on the literature review, the best, reasonable estimate of cumulative spillover costs on residential property values due to distressed vacant properties. This effect is -3.15% for each distressed vacant property within 500 feet, which is the average of the results from the studies estimating the effects of tax delinquent properties. Again, only the effects of vacant properties identified in the Vacant Property Data Set that were classified in the County data as in “Poor,” “Very Poor,” or “Unsound” condition, or properties that were condemned were considered, so it is appropriate to use the median of the spillover coefficients from studies looking at more deleterious properties, rather than simply vacant ones.

The right-hand column in Table 4.3 presents the results for a much more conservative set of assumptions, which lead to smaller spillover cost estimates. This row assumes that distressed vacant properties have only a -1.12% effect on home values within 500 feet. This magnitude is the average from the studies in Table 3.1 that estimate the impact of vacant (but not tax delinquent) properties on home values.

**Table 4.3. Estimates of Cumulative Spillover Costs on Residential Property Values and Property Taxes Due to Distressed Vacant Residential Buildings**

	Best Reasonable Estimate	Very Conservative
Effect of Distressed Vacant Structure within 500 Feet on Residential Property Value (1)	-3.15%	-1.12%
Cumulative Effect of Distressed Vacant Structures, 2012 Base Year Assessed Values (2)	- \$210,356,469	- \$74,793,411
Cumulative Effect of Distressed Vacant Structures, Assuming 26.61% Increase to 6/2016 (3)	-\$266,332,325	-\$94,695,938
Average Effect Per Distressed Vacant Structure (based on 2016 estimated cumulative loss) (4)	-\$194,403	-\$69,121
<b>Potential Cumulative Impact on Annual Property Tax Revenue (5)</b>	<b>-\$4,812,956</b>	<b>-\$1,711,273</b>

(1) All estimates assume no further effect when count of properties within 500 feet exceed 5.

(2) Assessed values are set at 2012 base year and not adjusted upward until next reassessment.

(3) Assumes average property increased in value by 26.61% from January 2012 to mid-2016. Used change in Zillow.com bottom-tier home price index over this period for City of Pittsburgh.

(4) This is simply the amount in the row above divided by the number of distressed, vacant structures (1,370).

(5) Estimated as total decline in value using 2012 base values X 0.02288. Assumes 22.88 cumulative millage rate for City, schools, county and Carnegie library millages (<http://apps.alleghenycounty.us/website/munipgh.asp>).

The best reasonable assumption results in estimated cumulative spillover costs of distressed, vacant residential properties on residential values in Pittsburgh is \$266,332,325, as of 2016. On a per-property basis, this estimate means that each of the 1,370 distressed vacant properties reduces the cumulative value of all homes within 500 feet of a distressed vacant property by approximately \$194,000. The loss in taxable value (which is based on 2012 values due to the base-value tax assessment approach used in Allegheny County), in turn, is associated with a decline in approximately \$4.8 million in annual property tax revenues.

A more conservative assumption is used in the second column of Table 4.3. Here, the average of the findings on vacant (as opposed to tax delinquent) properties is used, with the spillover estimate of -1.12% per vacancy. Under this assumption, the cumulative effect on home values is -\$94,695,938, with an effect of -\$69,121 per distressed, vacant property, and a decline in expected annual property taxes of approximately \$1.7 million.

With average spillover costs estimated at over \$190,000 per distressed vacant property, and estimated tax losses that accumulate to an estimated \$4.8 million annually, a benefit-cost perspective suggests that based on these costs alone, substantial investment in remediation or demolition of such properties may be warranted. Combining these costs with the substantial cost savings that might be obtained by reducing costs in Sections 2 and 3, the argument for public investment in remediating or demolishing distressed vacant properties becomes even stronger.

## **A CAVEAT: MITIGATING ANY NEGATIVE EFFECTS OF POORLY MAINTAINED VACANT LOTS FOLLOWING DEMOLITION**

While a number of recent studies (Griswold and Norris, 2005; Griswold et al, 2014; Whitaker and Fitzpatrick, 2014) have found that that demolition programs in Flint, Michigan and Cleveland, Ohio have resulted in significant reductions in spillover costs on local property values, the experience of some cities suggests that if the vacant lots resulting from demolition are not addressed adequately they can create their own set of spillover costs. The city of Philadelphia, in particular, after engaging in major demolition campaigns in earlier years, has found that large numbers of poorly maintained vacant lots create their own sets of problems for communities (Econsult and University of Pennsylvania, 2010). Moreover, recent research on greening programs aimed at greening and maintaining these lots show large positive impacts on neighboring property values (Buchianeri, G., K. Gillen, and S. Wachter, 2012). These effects are due both to the elimination of the negative impacts on the neighborhood of a neglected vacant lot, but also due to the positive amenities provided by well-maintained greenspace.

Therefore, if the City increases its efforts towards demolishing distressed, vacant homes, it should plan for greening and maintenance activities and costs going forward. Otherwise the investment in demolition may not result in a substantial rate of return in terms of increased property values and tax revenues.

# SECTION 5. CONCLUSION: AGGREGATING THE SERVICE AND SPILLOVER COSTS DUE TO VACANT PROPERTIES IN PITTSBURGH

The purpose of this study was to estimate the costs imposed by vacant properties in Pittsburgh. Section 2 gathered and analyzed data on costs to the City in terms of service costs in dealing with vacant properties through code enforcement, police, and fire protection services. Section 3 estimated the annualized tax losses associated with vacant properties that were more than two years tax delinquent. Section 4 identified the spillover costs of distressed vacant properties on residential property values in the City, and the loss in property taxes associated with these spillover costs.

It is important to point out that costs identified in this study are by no means comprehensive. Some likely costs are not included in the study. For example, because there is little-to-no research of the effects of vacant properties on the values of commercial properties, these effects are not captured here, and these costs are likely to be significant. Moreover, whenever uncertainty of costs was encountered, efforts were made to be conservative. Therefore, the findings here should be viewed as a lower bound estimate on the costs imposed by vacant properties on the City, and on other divisions of local government, such as Allegheny County and the Pittsburgh Public School District.

Notwithstanding this caution, this lower bound on costs of vacant properties and distressed vacant properties across Sections 2, 3, and 4 of this study are described in Table 5.1. The best reasonable estimate of *annual* costs associated with vacant properties in the City is \$9.1 million with a very conservative lower bound of \$6 million. These figures do not include many unmeasured costs, including court costs for code enforcement efforts, unrecovered boarding or demolition costs, costs of injury from fires, and the spillover costs on commercial buildings.

Beyond annual costs, the best, reasonable estimate of one-time costs to residential property values are estimated at \$266,332,325. This estimate is based on using the studies that appear most appropriate for estimating the impact of physically distressed and disinvested properties on nearby home values. For the purposes of providing a minimum estimate of the magnitude of these impacts, Table 5.1 also provides a much more conservative estimate of \$94,695,938, based on studies that examine in the impact of all vacant properties – and not just distressed or tax delinquent properties – on nearby property values. While these costs accrue mostly to

property owners (including homeowners) and not directly to local government (other than the property tax portion), they should be considered as part of the overall costs of vacancy and blight.

**Table 5.1. Estimated Costs Due to Vacant Properties in the City of Pittsburgh<sup>21</sup>**

	Annual Costs		One-Time Losses	
	Best Reasonable	Very Conservative	Best Reasonable	Very Conservative
<b>Service Costs</b>				
Code Enforcement	\$246,290	\$246,290		
Police Dispatch Costs	\$1,126,566	\$1,126,566		
Fire Department Dispatch Costs	\$580,025	\$580,025		
<b>Losses Due to Long-Term Tax delinquent Parcels</b>				
Annualized Tax Loss	\$2,338,206	\$2,338,206		
<b>Spillover Costs</b>				
Loss in Residential Property Values			\$266,332,325	\$94,695,938
Annual Decline in Property Tax Revenues	\$4,812,956	\$1,711,273		
<b>Total Estimated Costs</b>	<b>\$ 9,104,043</b>	<b>\$ 6,002,360</b>	<b>\$ 266,332,325</b>	<b>\$ 94,695,938</b>

<sup>21</sup> As discussed earlier in this analysis, these costs are not comprehensive.

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