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Healthy Homeworks' Property Health Report

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Executive Summary

Amy Smith of Healthy Homeworks, a Maine-based non-profit, expressed a need for assistance in creating her novel Property Health Report (PHR) database. Her idea revolves around the democratization of data for the rental housing stock in Lewiston, ME, a housing stock which is identified as aging. This property health data will be democratized in the form of an easy-to-understand, user-friendly, online interface that is available to the public. The prototype PHR will put property health data, located in a master database, into an algorithm to assign an objective grade to each property in the prototype. The PHR project overall is extremely detailed and needs a solid, organized framework from which it can grow.

Our group worked in conjunction with Amy Smith to develop her prototype and primarily focused on the first steps of the project. These firsts steps revolved around laying the groundwork for the PHR, so data collection from identified data holders could be efficiently obtained. Our method to establish this groundwork revolves around three main steps. The first one involves establishing the scope of the database and collecting unique identifiers for the properties included. The second step focuses on what data regarding property health needs to be collected and categorizing that data into three easy-to-understand grades. The final third step involves identifying individuals who oversee the data used for grading.

Using our methods, we were able to populate the database with unique identifiers for properties in downtown Lewiston. The process of collecting ownership data, data which

identifies the name of the individuals who can be contacted regarding issues with the property, highlighted the need for a democratized user interface. Ownership information was scattered across multiple online databases and the ownership information on each of these databases was not consistent. We found that the Lewiston municipal water bills were the most accurate and consistently updated source for ownership information.

The results for the other two steps were products of Amy Smith's learned knowledge of the Lewiston rental housing stock. We were fortunate enough to have someone to consult with regarding what property data should be used for the grading system. We also consulted with Amy Smith regarding where the issue datasets could be located. The collection of unique identifiers, identification of issue datasets to be used for grading, and the identification of the individuals who hold this data all allow for the efficient collection of data to populate the master spreadsheet. In the future, if the steps taken to create this novel prototype prove effective, similar models of the PHR prototype can replicated elsewhere using a similar methodology that is adjusted to that city's rental housing ecosystem.

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Introduction

In the United States, it is difficult for a renter or possible investor to easily gain information on the health of a property. The sources that are currently easily accessible, such as Zillow.com, are superficial and offer no information on whether the home has been previously abated for example. It is important for possible renters for example to have access to information on the property because some environmental, legal, maintenance, and financial issues pose possible health risks to them. In some cases, poor conditions of a home have the potential to cause severe health conditions in all occupants, such as lead poisoning and cancer.

The data and information regarding the health of a home is available, however the way the data is stored and organized is the primarily issue. There are three main types of data that exist within the united states: public, open, and democratized (Figure 1). Public data refers to all data that someone has access to, whether it be through online databases or by filing a Freedom of Information Act request. Open data for example, can be data that is scattered through multiple online databases that are all updated on different schedules. In some cases, data and information regarding property health is not yet digitized. Due to the fact that this data is dispersed, and in some cases helpful data is concealed, it is difficult for a possible renter or investor to located especially if they do not know to look for this kind of information in the first place. It is both difficult to locate this data and difficult to collect this data. Finally, there is democratized data which refers to data that is accessible, easily to locate, understand, and easy to use. In a Harvard-led symposium on Inequality and Inclusion, one report about democratized data in the home buying industry acknowledges the vast improvement in access to simple data, but does not mention the existence of, or need for detailed records on what we consider to be the health of the

property (McLaughlin and Young, 2017). Our project is focused on providing objective indicators that go beyond size and price and give a window into the quality of the property.

The Property Health Report (PHR) is a prototype platform of democratized data that serves to resolve this issue of data on property being scattered, difficult to access, and difficult to understand. The PHR presents information on properties to create individual reports that detail the physical, environmental, and financial health of the property. By bringing important housing data together on a single user-friendly interface, data is being democratized and available to the public to use as a tool. This database is first of its kind regarding the depth and detail included in grading a single building and will serve as a model for other cities facing a similar rental housing stock issue.

The prototype PHR will focus on the city of Lewiston, ME which is a city that has an old, aging, housing stock. In downtown Lewiston, approximately 90% of the properties were built before 1970 (Harvard Community Development Project 2014, 36). For example, homes built before 1970 can possibly contain lead paint, poses health risks and which was banned in the US in 1978. The PHR aims to develop a system of democratized data that will allow possible renters and investors to easily assess and understand data regarding the Lewiston rental housing stock. Amy Smith of Healthy Homeworks, a Maine-based nonprofit, developed the idea of the PHR and is spearheading the development of the Lewiston prototype. For this project, we will work in conjunction with Amy Smith to develop the groundwork for the PHR.

Our research aim for this project is to develop a deeper understanding of the Lewiston rental housing stock, and gain insight as to how property health data is dispersed and maintained. Our research objective for this project is to create a strong foundation for the PHR which it can further develop from in an efficient manner. Future steps are required for the completion of the

PHR, making it essential that the groundwork for the prototype. These initial organizational steps will ensure that the future steps taken are also organized, ensuring that this prototype PHR is comprehensive and its data is displayed in a logical manner.

Methodological Approach

Our methodological approach is comprised of three main steps (Figure 1). The first step is to determine the scope of the database which involves what blocks within the city will be of focus, and collect unique identifiers for properties in the area. The second step is to determine what datasets on environmental, financial, maintenance, and legal issues will be used to calculate the grade of a property as well as what grading category into which they fall. Lastly, individuals and entities that control this data will be identified. Our methodology focuses on the groundwork that must be conducted before the next steps developmental steps of the PHR can be taken. For example, the unique identifiers collection in the first step will be used to collect data, identified in step two, from their data holders, identified in step three.

Step one first involves identifying the scope of the PHR. For this prototype, we chose to focus on a city that is known for its aging rental housing stock, and chose an area that has a high concentration of older properties. Step one involves the collection of unique identifiers which are pieces of information that are associated with a singular property, allowing for properties to be differentiated from one another. Unique identifiers refer to parcel IDs, address, and ownership information. Parcel IDs for example refer to the piece of land the property is located on, the parcel ID is associated with the deed of the land. Step one can be completed by using open data (Figure 2). Possible open data sources include, water bills, tax records, the identified city's GIS parcel viewer, and the state's LLC records. This data can be found in online databases or a

government office may need to be contacted in order to retrieve this data. Data on unique

identifiers, however, are the backbone of the PHR's database, specifically parcel IDs, because

each property has its own each set of unique identifiers. Thus, information from the datasets on

environmental, maintenance, financial, and legal issues can be associated with one specific

property.

The unique identifiers not only organize the PHR but are given to data holders to collect

data on each property included in the PHR prototype. This data is then used to compute an

objective score with an algorithm. Step two revolves what issue datasets should be included in

the PHR's grading system and what issue datasets will be weighted more than other in the

algorithm. These issues fall into the four main categories of environmental, maintenance,

financial and legal. Based on the amount of risk they pose to a potential occupant, they are

ranked into three main grading categories. These categories are "Hazardous", "Known Issues",

and "No Known Issues" (Figure 3). These categories are in order from posing the greatest risk to

health to the least risk to health. Although not part of these methods, the algorithm used the data

from the issue datasets to determine one of these objective grades for a property.

Examples of these issues are back taxes owed, lead abatement, and the property's heating

system has not been changed for the past 25 years. The health risk that the identified issue poses

varies. If an issue is a known health risk, such as if a home has an outstanding abatement order,

then the issue will fall into the Hazardous category. If an issue is a common indicator of a

possible health risk, then the issue will fall into the "Known Issue" category. The "No Known

Issues" category refers to the absence of the issues identified within the PHR, essentially it has

the opposite of the issues included in the other two categories. An example of an "issue" that

would fall in this third category is that the home has been inspected. So, in the absence of the

issues identified within the other two categories, the property will be given an objective "No Known Issues" grade. Due to the severity associated with the Hazardous category, the category and the issue datasets that fall into it, are weighted the greatest out in comparison to the other two and, if an issue from this category is present at a property, the property will receive a hazardous grade.

In order for information on these issues to be collected, where to get the data first needs to be identified. Amy Smith, our community partner in this project, identified data holder based on her learned knowledge of the Lewiston housing ecosystem (Figure 4). This third step is the final step for establishing the groundwork of the PHR. Although this methodology ends, more steps are needed to be taken to complete the PHR (Figure 1). After this third step has been completed, data holders can be contacted and datasets of the various environmental, maintenance, financial, and legal issues can begin to be collected. For this future step, a top-down method will be utilized.

Results and Discussion

Our project represents part of a larger process which will culminate in a public website, accessible to users at any time, regardless of housing-specific knowledge. The PHR represents a form of democratized data, meaning that it is an aggregated source of data presented in an easy to-use format so non-experts can make highly informed decisions. We found that the overwhelming stock of data sets used on the PHR to be in the form of public data, with a smaller portion comprised of open data. Public data is ranges in format, accessibility, and transparency to its users. Within the realm of public data, there is a smaller subsection of open data which is presented in an easy to access, well structured and reliable format. In our process for example,

the lead abatement orders were gathered by filing through foia (public data as it is a lengthy process to access) and the owner contact information was garnered from open data (City of Lewiston Utility Bills). On the PHR, both of those data points will appear, on an user-friendly interface that seeks to preempt the questions a user will have — such as, "What is the difference between the 'Legal Owner' and the 'Property Manager' contact information?"

For every parcel within the scope of the PHR, we think that it is our responsibility to determine *who* is responsible for the current condition of the property, and *what*, precisely, is the current condition of each and every parcel. Since we are compiling objective data into a site intended for the use of renters, owners, and landlords as mentioned in our aims, we also took on the responsibility to establish some sort of way to compare and contrast the distinct homes as to offer a user-friendly site. To this it was important to categorize the data sets to ensure they were painting a complete picture or potential of a healthy home, and to establish a grading system that can help inform decisions surrounding housing.

That said, we understand the initial results of the PHR to be only a prototype of the finished and live product. It is a crucial step as the process moves forward to collaborate with the data holders to keep the conditional data on the parcels up to data. As the methods section touched on, the PHR goes around bottom-up functions such as asking and answering and relies almost entirely on the commitment of the key identified data holders to supply relevant and reliable data sets. As we move forward and convene with the data holders that have been identified (see Figure 6), it is important to ask questions including: "What is the minimum dataset needed from each data holder?" and "What is the least time-consuming way for the data holder to share the data on a reliable, regular basis?" These question are vital is we are to incentive the data holders to put their stakes into the PHR.

Objectivity is a theme that guided us throughout the project. The release of rental housing data has a history of being controversial in Lewiston, so we needed to make sure that every piece of information we collected was based on a physical or numerical fact determined by widely accepted standards or governmental regulations (Rice, 2018). The democratization process must remain objective. In creating the ranking system, we stuck to objective considerations based off of life safety.

A large portion of our role within the project can be considered as interpretation. In navigating various platforms of open and public data, we were faced with abbreviations and categories that we did not understand. In order to remedy this, we reached out to the data holders, website curators, or Amy to hear them explain these classifications in nontechnical speak. From here, we extracted what data was relevant and re-labeled it in a plainclothes manner. In creating the PHR, we are potentially eliminating the need for these time-consuming interactions that dissuade or intimidate people from learning about the housing market.

Recommendation for Next Steps

The scope of our semester's work represents the foundation for populating the test iteration of the PHR. The next step in the overall process is continuing to collaborate with data holders and collectively decide how to display the data. At the very end of our project, we were able begin this process and attended two meetings with the Lewiston Fire Department. These two meetings together followed a rough format that we believe is a good model for future interactions with data holders:

1. Learn about the data holder's personal role, responsibility and process. It is important to understand how the department functions in order to see what role

data serves in their job. Often, data is a byproduct of the primary job of the department, and is used just for record keeping or legal reporting. Data may be stored in a variety of ways and mediums. Departmental budget and staffing constraints may affect how often data is collected, as well as the scope of the data collected. In some cases, confidentiality may be involved

2. Explain the role of the PHR and frame it in a way that exemplifies how it serves the data holder. The Property Health Report is based on an accurate database of information from these data holders, so it is imperative that data holders understand and agree with the goals of this project. Objectivity is a critical thing to convey, as well as the prototypical nature of the ranking system. Data holders are, and should be treated as, the resident experts. Nuances to data help to better inform where data points or values would fit within the ranking system.

3. Collectively identify which pieces of data are crucial to the PHR. In pursuing the goal of democratized data, one of the most important roles as the mediator is to determine which pieces of data most concisely and accurately convey the relevant health statistics of the home. For example, simply passing or failing a fire inspection may misrepresent the actual condition of the unit. Under the Maine State fire code, storing items in a hallway constitutes a life safety risk and then results in a failing grade. It is important to distinguish which issues are more critical in the eyes of the data holder, such as the absence of fire exits or smoke alarms (Brian Stockdale, Personal Conversation, 11/16/18). Some pieces of data stay internal to the department, so understanding what each abbreviation, value, or

category means is important in order to clearly explain and represent the final data to an uninformed user.

4. Collaborate with the data holder to establish a dataset and update schedule. The goal of this step, once the crucial pieces of data are agreed upon, is to create a system of updates so that the Property Health Report stays accurate. This step is about streamlining the process on the end of the data holder.

We anticipate that all the data holders will not share the same time schedules in their administration of data sets, meaning the data sets we grab from then will not be updated collectively. This could mean that some information on the PHR is updated biannually while another is updated quarterly. Along these lines, but regarding the grading system of the PHR, it still remains to be worked out *when* the terms of the grade will be applied to the parcels. What we mean by that could be better explained in an example: if a property gets a NOV on Tuesday, the data set is updated monthly and is released on Friday then the property is tagged with that known issue and colored yellow, for example, and then the NOV is rectified over the weekend on Sunday; based on the monthly updating system as determined by the data holder and Healthy Homeworks, yellow grade would remain until the following month. Objective data is the foundation of the property health report, so this is a step that we expect to take a considerable amount of time, collaboration, and reworking.

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McLaughlin, Ralph and Cheryl Young. "Data Democratization and Spatial Heterogeneity in the Housing Market". *A Shared Future: Fostering Communities of Inclusion in an Era of Inequality.* President and Fellows of Harvard College, 2017. http://www.jchs.harvard.edu/sites/default/files/a_shared_future_data_democratization_spatial_heterogeneity.pdf

Rice, Andrew. "Lewiston Landlords Clash Over Rental Registry" *Sun Journal.* Lewiston Sun Journal. 4 September 2018. https://www.sunjournal.com/2018/09/01/lewiston-landlords-clash-over-rental-registry/

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Appendix—Figures referenced and figures of results

Figure 1: Diagram that demonstrates the differences between the various kinds of public data available to a possible renter or investor.
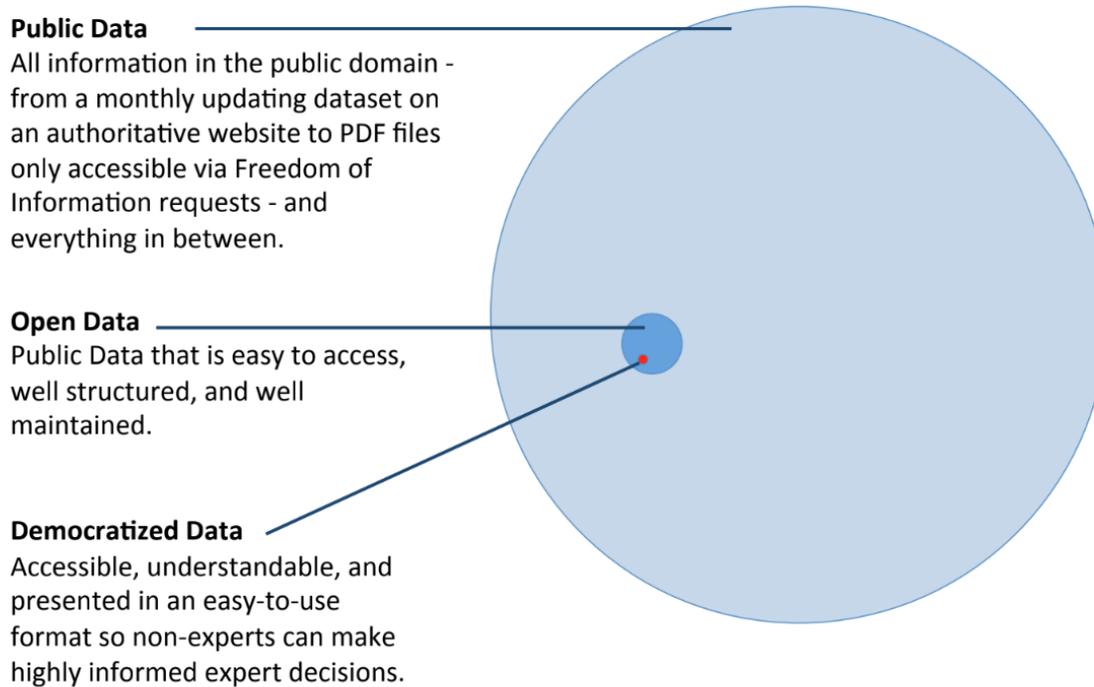

Public Data
All information in the public domain - from a monthly updating dataset on an authoritative website to PDF files only accessible via Freedom of Information requests - and everything in between.

Open Data
Public Data that is easy to access, well structured, and well maintained.

Democratized Data
Accessible, understandable, and presented in an easy-to-use format so non-experts can make highly informed expert decisions.

Diagram credit: Amy Smith

Figure 2: Outline of whole PHR process with our methodology (Steps 1, 2, and 3) identified.

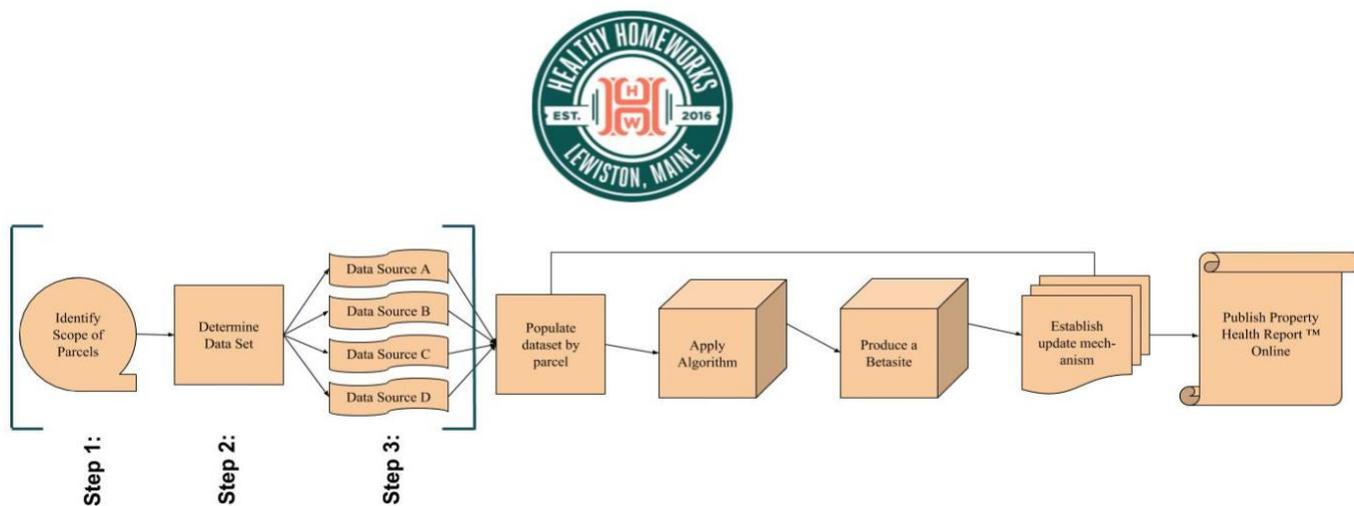**Figure 3**: Grading category breakdown, highest weighted category is Hazardous and lowest weighted category is No Known Issues

Hazardous-Current public safety risk

Known Issues-Current issues that may or may not pose an immediate health concern

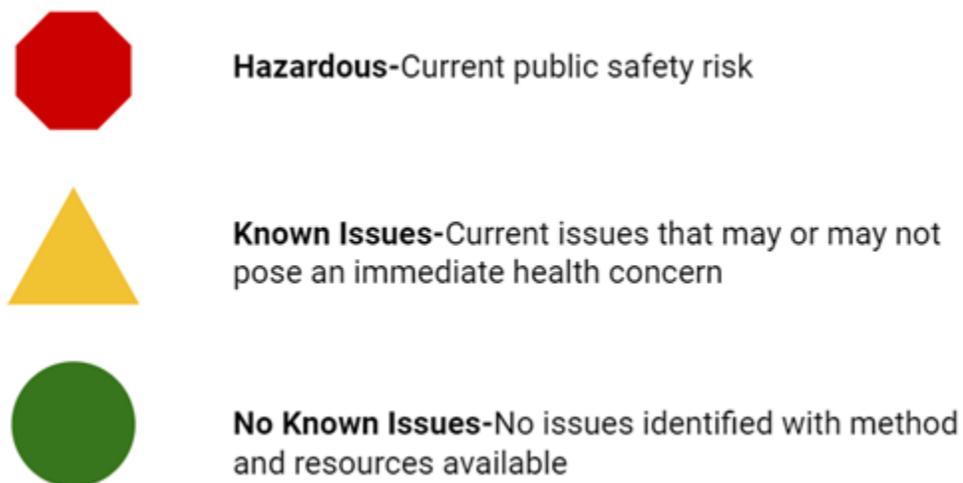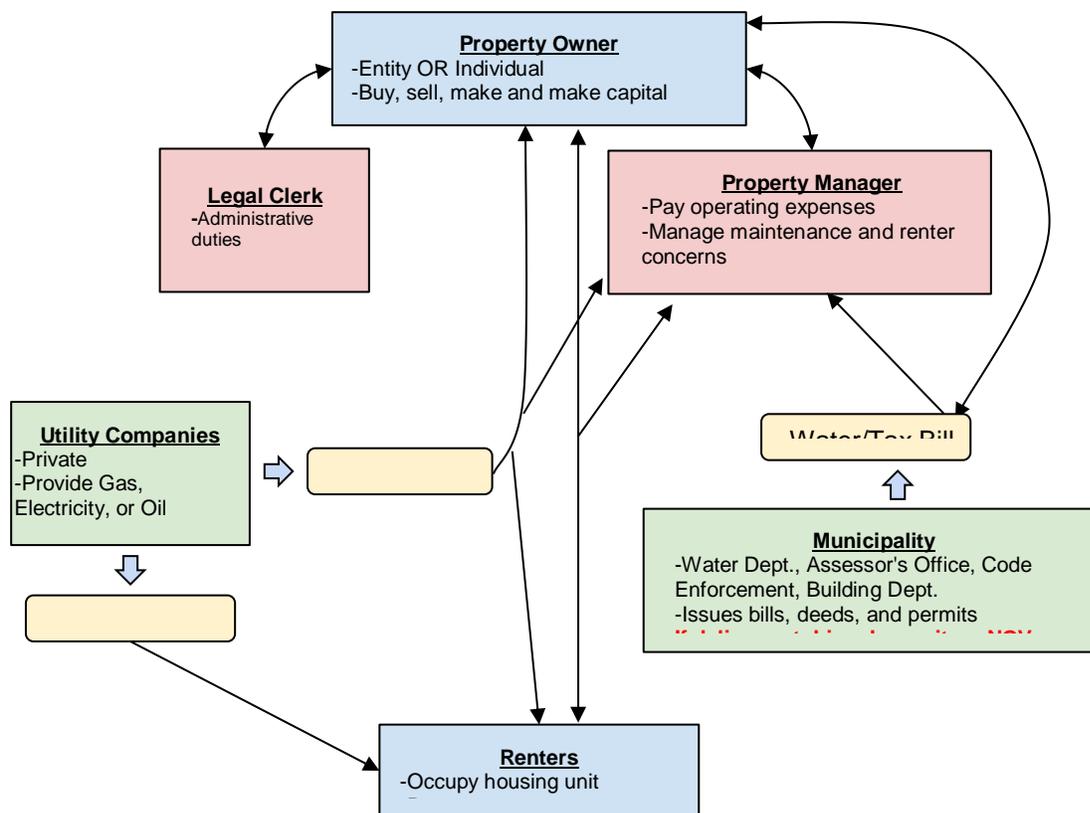**No Known Issues-**No issues identified with method and resources available

Figure 4: General diagram of the rental housing ownership ecosystem. The housing ownership ecosystem refers to the players involved in maintaining, servicing and occupying each rental housing unit or cluster of units. Their descriptions and relationships are explained below.

Definitions

Property Owner: This is the individual who owns the rental unit. Units may be owned by legal entities such as limited liability corporations, associations, or realty trusts, but behind all of these groups are one or a few people who make the major decisions. Property owners make decisions regarding the buying and selling of units, as well as major investments, repairs, or renovations. Property owners may also directly enter agreements with renters, or at least screen rental applications when they have a property manager. Property owners make the hiring and firing decisions of legal clerks and property managers.Without a property manager or legal clerk, property owners take on all of the responsibilities of those actors.

Legal Clerk: The legal clerk, if one exists within the particular ecosystem, assists the property owner in administrative work and legal counsel regarding lawsuits, taxes and finances, and the creation and management of legal property-owning entities. Many of these entities are registered with the state under the legal clerk's name.

Property Manager: The property manager, if one exists within the particular ecosystem, manages some of all of the non-capital decisions for the units owned by the property owner. The particular duties and powers of the property manager vary case-by-case, but they may include such tasks as paying utility bills, hiring small contractors or property maintenance companies, and managing renter complaints.

Municipality: The municipality interacts in the ecosystem indirectly, serving as both an actor of service, inspection and enforcement. Different departments provide water, collect records and issue taxes, perform routine

code inspections, and issue building permits. All of these bills and charges are issued to the property owner or property manager. If the ownership entity fails to pay bills or taxes, fails inspections, or fails to fix violations, the municipality may place liens, file lawsuits, or issue notices of violation (NOVs).

Utility Companies: Utility Companies provide service to the rental units. This usually is electrical power, natural gas for heating and/or cooking, and oil for heating. Bills are issued depending on if the properties are metered per-building or per-unit, with electricity being separately metered most of the time. If the responsible parties fail to pay bills, utility companies have the right to shut off service.

Renters: Renters are the individual or individuals responsible for occupying the property, following the lease or rental agreement and reporting violations of fair conditions or contracts to the ownership entity or municipality

Figure 5: Categorization of all issues into the three grades, these are the data sets that will be used by the algorithm to assign an objective grade to a property.
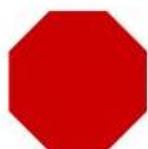
Environmental: Condemned or Abatement Order
Financial: N/A **Maintenance:** N/A **Legal:** N/A

Environmental: Lead Risk, Reported disorderly conduct **Financial:** Bank Owned, Back Taxes or Utilities Owed **Maintenance:** Permit expired or Incomplete, Inspection not completed in 3+ years **Legal:** LLC not in good standing, Unit not registered
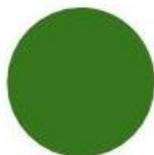
Environmental: No outstanding code/fire/LHA/lead violations **Financial:** No back taxes owed, No liens, Not bank owned **Maintenance:** Inspection passed within past 3 years, no expired/incomplete permits **Legal:** LLC in good standing, Owner registered with city

Figure 6: Table of results that identifies the various data holders and the data that they can contribute to the PHR for the Lewiston prototype.

PHR Grading Rubric:
And, Where to Find Data

Legend:
- = Environmental (purple)
- = Legal (pink)
- = Maintenance (orange)
- = Financial (blue)

Data Holder	Notice of Violations	Hazardous	Crime	Lien	Ownership	Registration	Permit
Dep. of Health & Human Services (DHHS)		Lead Abatement Order					
Community Concepts (CCI)	Lead Risk	Lead Abatement Order					
Andro. Reg. of Deeds				Other Payments Owed	Bank Owned		
Maine Secretary of State					LLC Not in Good Standing		
Lewiston Housing	Housing Deficiency						
Lewiston Fire	Life Safety						
Lewiston Police			Disorderly				
Lewiston Treasury				Public Utilities Owed / Back Taxes Owed			
Lewiston Code	Code	Condemned				Not Registered	Expired/ Incomplete

Data Set