Funding Urban Conservation: A Study of Bothell's Wayne Park

Christin Deakins

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Introduction

This research report was created to support the City of Bothell's current decision-making process in the Wayne Park conversion project. In December 2017, the City of Bothell purchased Wayne Golf Course with the intention of converting the entire 89-acre property to a public city park[1]. Bothell funded the purchase with the help of grants and a partnership with King County[1,2]. The city seeks to develop 4 acres within the front 9 portion of the Wayne Golf Course into an economic engine that will activate the land and offset costs associated with the purchase and maintenance of the 89-acre park. The purpose of this study is to evaluate the economic impact of the city's purchase of Wayne Golf Course by answering the following research question: Will the conversion of Wayne Golf Course into a City Park have a positive impact on surrounding property values, thereby (partially) offsetting the cost of the project? The City of Bothell is a rapidly developing suburban city experiencing a population boom and this purchase draws attention to a greater question of how we fund conservation in rapidly developing areas.

I began by conducting a budget analysis to gain a clear understanding of the City's Parks and Recreation budget and to identify the primary funding sources for Bothell's City parks. Property values, by way of property and excise tax, are a likely funding source for Bothell. The Wayne Park conversion project will likely have an impact on surrounding property values. Before calculating the impact with a hedonic model, I first needed to identify the sources of funding to Bothell's Park and Recreation budget to be sure that property related revenue has a meaningful impact on this department. Next, working closely with my advisor Dr Tate Twinam,

I built a hedonic model to predict the impact on surrounding property values. As golf courses may be an amenity to many property owners, loss of Wayne as a golf course may have a confounding impact on surrounding property values. To account for this possible change in property value, I will be identifying the impact of proximity to golf courses separately from the impact calculations for adding a park. I predicted the city will see increased property tax revenue resulting from the conversion of the Wayne Public Golf Course into a city park.

Background

Wayne is an 89-acre public golf course located in downtown Bothell, WA, along the banks of the Sammamish river. The future park was purchased in two separate transactions in December 2017; both areas are part of the park conversion project. Bothell purchased the area known as the Front 9 for $3.6 million USD, drawing from the City's impact fees[1,2]. The Front 9 is 49.9 acres in size, all but 4 of which are covered by a 1996 Conservation Easement that limits use on this area to passive recreation. The club house sits on 4 acres known as the Active Use Area, which are exempt from the 1996 easement[3]. The City is seeking to develop this section of property into an economic engine. Bothell spent $450,000 on the purchase of the Back 9; additional funding for this purchase came from grants and use of the King County Conservation Futures Fund[1,2]. As part of the agreement in using the King County Conservation Futures Fund, a 2017 conservation easement was placed on the Back 9, further limiting the use of this area. Golf is no longer allowed in the park[4].

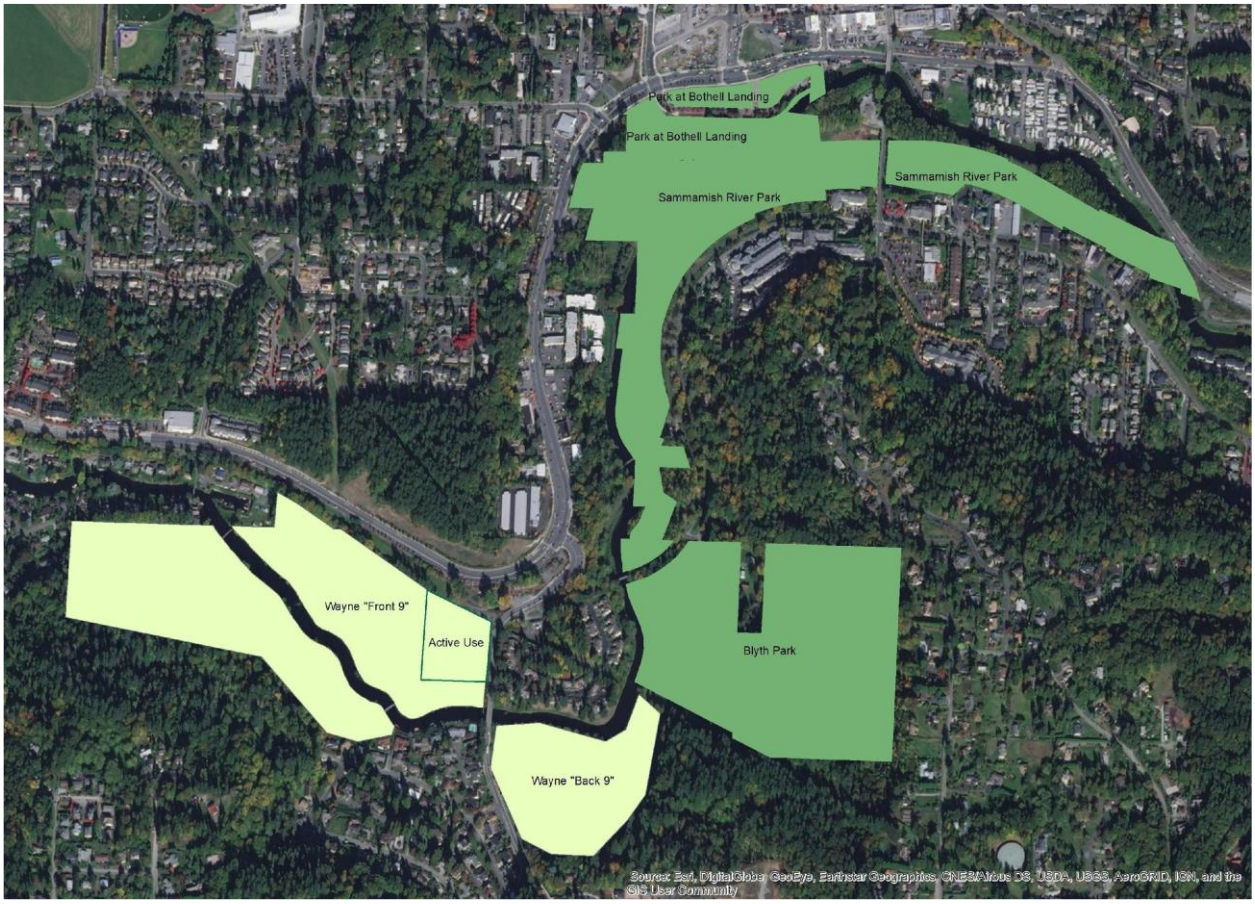
The location of the park is significant for two reasons: 1) The park sits in the heart of a rapidly developing city, and 2) this purchase created a large connected corridor of conservation lands along the Sammamish River. Bothell is likely to see a continued decrease in available land

for green space as development and population density increase. Bothell has been designated a core city by both King and Snohomish counties under the state Growth Management Act (GMA). This means that Bothell will continue to see growth throughout the city, but particularly in the Downtown Core and Canyon Park areas. As a core city within King County's Urban Growth Boundary, the City is obligated to continue to provide increased housing options.

As population increases, so does the number of people needing access to open park space and outdoor recreation, yet the development boom creates scarcity of available land. This issue is compounded by the rising cost of land in developing areas. As in any market, scarcity of resources coupled with high demand will drive up any remaining land prices. The City's purchase of Wayne ensures the Bothell community continued access to greenspace in the heart of a rapidly developing city center. My research fundamentally engages with these pressures for developing regions: How do we increase density without separating people from nature? And more specific to this paper, how do we fund parks in rapidly developing cities?

The second reason the location is significant is the size of this park, and the connected corridor it created along the Sammamish river in downtown Bothell. Map 1.1 shows the connected corridor where existing parks are colored dark green, and the newly acquired Wayne Park is denoted in a lighter green. Bothell Landing Park, the northernmost park on the map, consists of 5.87 acres of park space. Directly South along the Sammamish River is Blyth Park which is 40.8 acres in size. The City's addition of Wayne Park expanded the park corridor by 89 acres, creating a total of 136 acres of preserved city park space along the Sammamish river. This increased connectivity of green space through downtown Bothell will increase resilience and benefit biodiversity conservation in this rapidly developing peri-urban area (Poiani, 2010).

Map 1.1



Map of Bothell's downtown park corridor. Dark green areas indicate current Bothell and King County Parks. Land purchased from Wayne Golf Course is demarcated with light green. Remaining tree cover is primarily privately owned. The Wayne park conversion has expanded the connectivity of green space in the Bothell downtown corridor.

Literature Review

Hedonic regression has been widely used to calculate impact of open space on housing prices in urban and peri-urban areas. This method does this by breaking a home into its various amenity and disamenity characteristics, then valuing each individually (Monson, 2009). With this methodology researchers can estimate impact of each individual amenity on property

value. While specific reports of impact vary, the vast majority of results indicate it is an effective methodology for calculating the amenity value of open space as expressed though housing prices. In a meta-analysis of 52 hedonic pricing studies, researchers found open space in urban and peri urban-areas had a significant positive impact on property values, with an increase in house value of approximately 0.1%. Furthermore, the impact of open space on housing prices increased rapidly the closer a house was to the open space (Brander & Koetse, 2011).

Additionally, several researchers have noted that type and size of greenspace affects the impact. Large parks and forests have been shown to have the greatest positive impact on property values, while properties such as cemeteries have a negative impact on housing prices (Czembowski, Piotr & Kronenberg, Jakub, 2015; Panduro & Veie, 2013). This research indicates people show a clear preference for type and size of open space as expressed through their willingness to pay higher prices for houses closer to large open space areas, like the Wayne Park conversion. This finding also suggests residents of Bothell may prefer parks over other forms of open space such as golf courses. This finding was considered in constructing my hedonic model.

In addition to the impact of size and type of open space on property values, other hedonic valuation studies have shown that population density is positively and significantly related to the value of open space (Brander & Koetse 2011). According to Brander & Koetse, remaining open space in populated and rapidly developing areas, is more highly valued; this suggests the Wayne Park conversion project is more likely to have a positive impact on surrounding house prices.

Due to regional variation in preferences for open space, specific impact values are not broadly transferable (Brander & Koetse 2011). While the majority of studies have shown significant positive relationship between proximity to greenspace and housing prices, the specific impact should be calculated regionally. In my preliminary study, I have not found any hedonic pricing studies for parks in King County, WA. This study addresses the gap in hedonic valuation of the impact of parks on property values for our region.

Methodology and Data

Budget Analysis

To more clearly understand the source of Bothell's park acquisition, redevelopment, and operations funding I conducted an analysis of Bothell's Parks and Recreation budget. My methodology consisted of archival research of the City's budget databases, as well as meetings and email correspondence with Interim Director of the Department of Parks and Recreation Tracey Perkosky. My data for this portion of the study came from the City of Bothell's publicly published budget information. Published reports included the 2017 – 2023 Capital Facilities Plan, Parks and Recreation & Open Space Action Program 2014, 2017 Financial Summary, and quarterly city Budget Reports for the first and second quarters of 2017.

Once I compiled all the budgetary information, I calculated percentages for each revenue category and mapped the data to clearly display the inflows and outflows of the Parks and Recreation departmental budget. Capital Improvement Fund and General Fund schematics can be found in the results section, pages 12 and 13 respectively. I found that the Parks and

Recreation Department draws from two funding sources within the City's budget; the General Fund and the Capital Improvements Fund. Each fund is represented with its own schematic of budget inflows and allocations. I review the schematics and outline my findings in greater detail in the results section below.

Property Value Impact Analysis

I used a spatial statistical method known as hedonic regression to calculate the predicted impact of the park conversion project on surrounding property values. Hedonic valuation theory suggests that the value of an item (such as a house, condominium, or parcel of land) can be broken down into the value of its amenity or disamenity components, which can be identified individually. Using this model, we can predict the values home buyers place on different amenities, such as proximity to parks. In building my model, I also had to account for the impact of losing Wayne Golf Course. Assuming proximity to a golf course could be considered an amenity, I aimed to calculate the impact of losing Wayne Golf Course on local property owners as a part of the conversion project.

I used the King County Assessor data, tract-level 2010 Census data, and publicly available GIS shapefiles from King County as the primary data sources in building my hedonic regression model. The dependent variable for this model was property sale price. The independent variables in this study were proximity to parks and proximity to golf courses, expressed in miles. I used 144 control variables in my hedonic model, which included property characteristics such as square feet, age at sale, number of stories, and date of most recent renovation. Neighborhood characteristic variables included zip code, proximity to water features, major highways, school district, distance to Seattle central business district (CBD), and

distance to local CBD. Finally, I included demographic information of the buyer and seller, including race, ethnicity and median household income.

The King County assessor dataset originally included over 1 million property sales and transfers, which was reduced to a usable sample size of 128,838 distinct home sales. Working in the statistical analysis program STATA, I isolated residential, single family properties; I then removed any instance of multiple identical listings of the same property and time of sale. A substantial portion of listings were later eliminated because they were missing necessary property characteristic information, including but not limited to sale date, number of stories, years since renovation, square footage, number of baths and bedrooms, and age at sale. Finally, I trimmed the top and bottom 1% of sales to eliminate outliers among property transfers; this largely eliminated properties transferred for the nominal value of $1 and sales of very high value properties not representative of most homes in the area.

After compiling a list of amenities, I gathered shapefiles for neighborhood characteristics, landscape characteristics, and golf course and park locations, and imported each to ArcGis. I began my spatial calculations by joining King County Assessor property sales data to the address shape file, to geolocate sold houses and allow for calculations to be done on an individual house level. Next, I joined the attribute tables for all of the amenities, including golf courses and parks, with the address and property sales table to consolidate of the data into one location. Finally, I used ArcGIS “near analysis” tool to calculate distances from individual houses to the nearest park, golf course, and amenities. These calculations gave me a new set of distance variables which I used to build the hedonic model. All distance calculations, including closest park, golf course, Seattle central business district (CBD), local CBD, and water features

were conducted at the individual house level. After these calculations were completed, I exported the dataset and uploaded the file to STATA to conduct the hedonic regression.

My hedonic model is included below. Distance to park and distance to golf courses were my independent variables. Indicator variables include number of bedrooms and bathrooms, single or multi-story, age at sale, years since renovation, zip code, and year and month of sale. For a full list of variables, complete with descriptions, see Appendix A.

Neighborhood characteristics were captured using school district, zip code and census tract data that was attached to individual property sale locations. Prices were allowed to fluctuate on these indicator variables to capture variations in neighborhood characteristics within a given city. Continuous variables included year built, distance to park, distance to nearest golf course, distance to local downtown, and distance to Seattle CBD. Fluctuations in the housing market over time were captured by including indicator variables for year and month of sale. NHGIS 2010 census data was used to calculate median income, population density, and demographic distribution at the census tract level. Demographic variables included race and ethnicity (white, black, Asian, and Hispanic) categorizations.

Hedonic Model:

```
areg  ln_saleprice  dist_park c.dist_park#c.dist_park dist_golf c.dist_golf#c.dist_golf dist_lake dist_seatt
      dist_cbd  ///  pct_black_afam pct_asian pct_hisp pct_other med_income gini_index pop_dens
      ///  sqfttotliving i.bedrooms i.bathfullcount i.fpsinglestory i.fpmultistory age_at_sale
      renov_at_sale  /// i.zip_id i.schds_id  ///  i.zip_id , vce(robust) absorb(sale_yr_mo_enc)
```

Results and Discussion

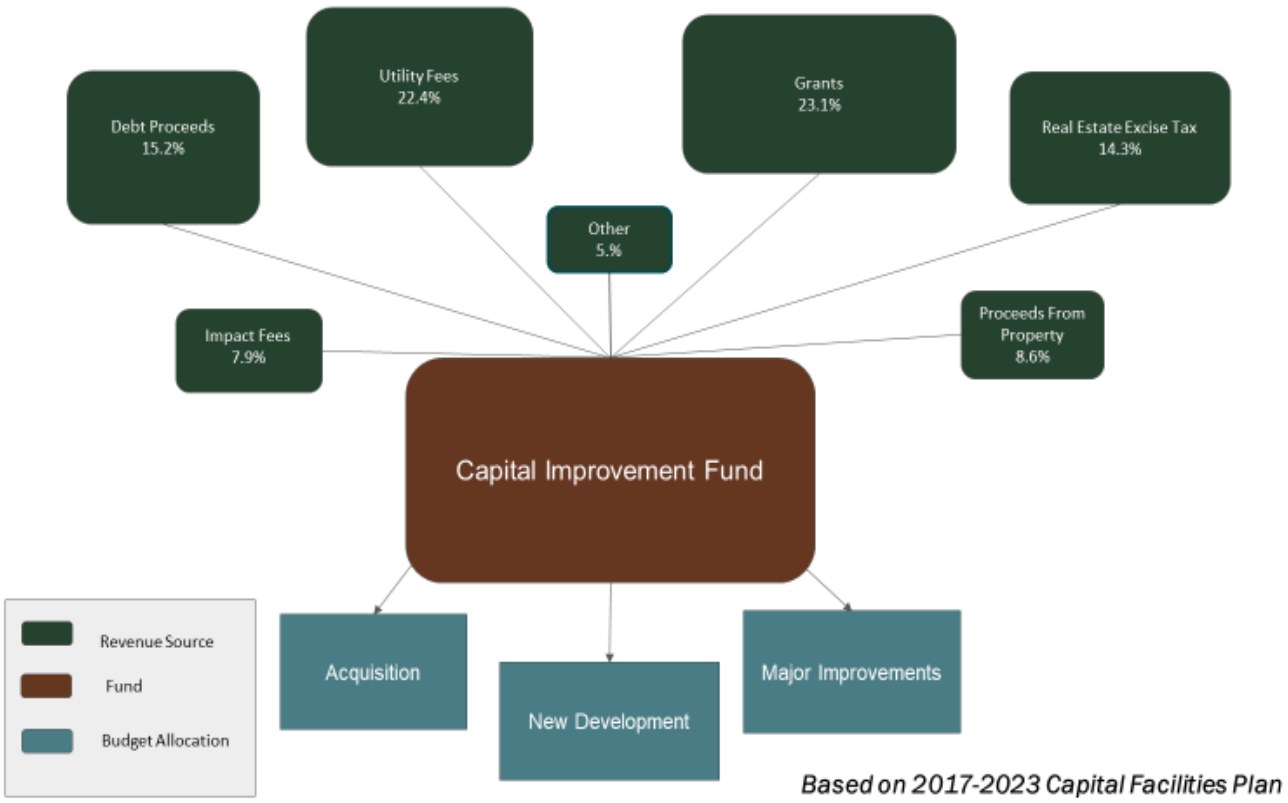
Budget Analysis

In my budget analysis I found that Bothell's Parks and Recreation Department draws from two primary funds for their budget: The General Fund and the Capital Improvements Fund. The Parks and Recreation Department used the General Fund for operations and management (O&M). Figure 1.2 shows the primary revenue sources for this fund include sales tax (26.52%), property tax (26.22%), utility tax (18.74%), charges for services (15.68%), permit fees (7.38%), grants and entitlements (2.47%), state shared revenue (0.30%), and fines and forfeitures (0.85%). The second most prominent revenue source for the General Fund is property tax, which was responsible for 26.22% of the General Fund's total revenue in 2016.

The Capital Improvements Fund is used by Bothell's Parks and Recreation Department to fund acquisition, major improvement, and new development of city parks. The primary revenue sources for this fund include: grants (23.1%), utility fees (22.4%), debt proceeds (15.2%), real estate excise tax (14.3%), impact fees (7.9%), proceeds from property (8.6%), and 0ther (5%)(See figure 1.1). The fourth most prevalent revenue source for the Capital improvements Fund is Real Estate Excise Tax at 14.3% of total revenue for this fund.

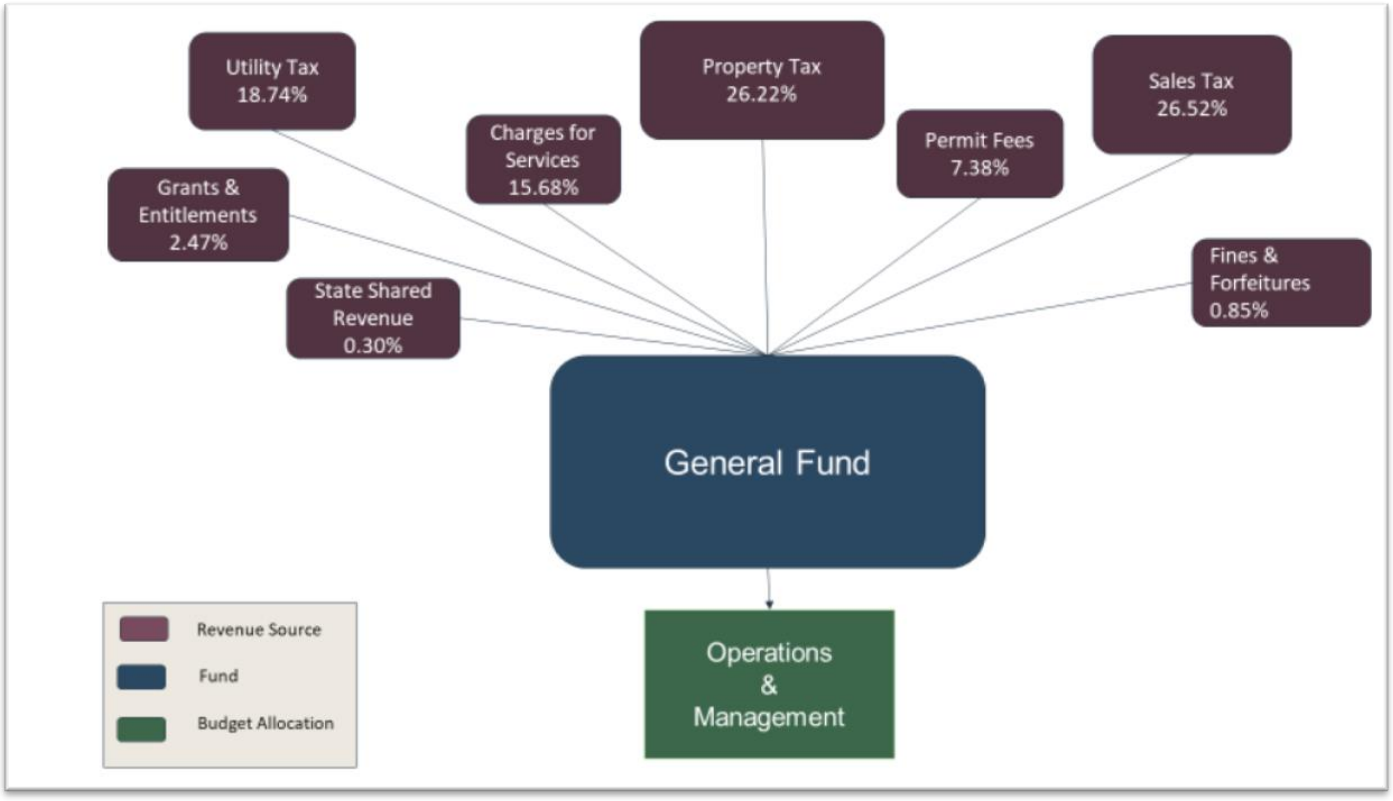
Both the Capital Improvements Fund and the General Fund rely heavily on property value related taxes (14.3% and 26.22% of budget, respectively); as housing prices increase so will the revenue coming into each of the two Funds. Based on this research it appears property values play a significant role in providing revenue to both of Bothell's park funding budgets.

Figure 1.1



Schematic of Capital Improvement Fund revenue source and budget allocation. Based on Bothell's 2017-2023 Capital Facilities Plan[5].

Figure 1.2



Schematic of General Fund revenue sources and budget allocations.[6,7,8,9]

A complete and accurate calculation of projected operations and management costs for the newly acquired Wayne Park cannot be completed without a Master Plan for the park. The master planning process is scheduled to begin later this year, in 2018. After speaking with the interim parks director, I was able to estimate initial maintenance costs associated with the acquisition. These expenses will come from the City's Capital improvements fund, which has already been allocated until 2023; however, the Capital Facilities plan is updated on a 2-year basis, with the next budget cycle slated for 2019. For this project to be self-funding, revenue sources leading to the capital improvements fund would need to be positively impacted to account for the initial cost of purchase as well as the initial maintenance costs outlined in table

1.1 below. As noted earlier, Real Estate Excise Tax accounts for 14.3% of projected Capital Improvement Fund revenue. A positive impact on property values from the Wayne Park Conversion project will have a direct impact on the Capital Improvement fund.

Table 1.1 Estimated Initial Expenses
Estimated initial expenses for the Bothell Parks and Recreation Department in the Wayne Park conversion project.

Expense Type:	Cost:
Maintenance Equipment	$75,000
Tree Removal and Trimming	$30,000
Restroom Facilities	$300,000
Clubhouse Updates*	Variable*
Onsite Storage Facility Updates	$50,000
Total:	**$455,000**

Table 1.1 outlines the initial costs associated with the acquisition and maintenance of Wayne Park. These cost estimations do not represent official budget calculations or requests for the city of Bothell.

* Costs variable dependent on types of updates made to facility and only apply if clubhouse is operated by Bothell Parks and Recreation Department. This cost could be absorbed by outside party in public-private partnership.

Hedonic Regression

I found the conversion of Wayne Golf Course into Wayne Park is likely to increase surrounding property values, with the greatest impact being within 0.25 miles of the park. Not only will surrounding properties benefit from the addition of a park amenity, but they are also likely to see an increase from the removal of Wayne Golf Course which was found to be a disamenity. The hedonic model showed that proximity to parks was associated with higher property values in King County (see table 1.2). I found a significant positive relationship

between property values and proximity to parks with property values increasing at a rate of 6.5 % approaching a park in King County [$p < 0.01$]. The greatest impact is within 0.25 miles of the park, as this is the distance that most people are willing to walk. Decay begins to flatten out after this point and turns approaching the 0.8 – 1-mile mark. This can likely be attributed to the majority of King County residents living within 1 mile of a park; property values upturn as houses approach the next closest park.

Conversely, the model showed a significant negative relationship between property values and proximity to golf courses (Table 1.2). Property values increase at a rate of 1.2% per mile moving away from a golf course [$p < 0.01$]. This finding was surprising, as I was expecting to have to account for the loss of a golf course as an amenity having a negative impact on surrounding property values. The significant negative relationship between property values and proximity to golf courses has exciting implications for projects like the Wayne Park Conversion. Not only can the city expect to see an increase in revenue resulting in an increase in surrounding property values, but the impact will be amplified by the loss of the golf course.

Additional significant findings from the model include a significant and positive relationship between distance to Seattle CBD and distance to lakes [$p > 0.01$], meaning proximity to lakes and Seattle's downtown is associated with higher property values. Property values increase at a rate of 1.0% moving toward lakes, and 1.71% the closer a property is to Seattle CBD. The model also revealed a significant negative relationship between property values and proximity to local CBD. I would expect to find a positive correlation between property values and the local CBD. I suspect the negative relationship can be explained by residents wanting to live close to downtown areas, but not too close to the main

street.

Table 1.2 Results of Hedonic Model

The dependent variable is the log sale price and can be expressed as percent change in sale price over distance in miles from given variable location.

	(1)
Variables	
Distance to park	-0.065***
	(0.008)
Distance to golf course	0.012***
	(0.002)
Distance to Lake	-0.010***
	(0.002)
Distance to Seattle	-0.017***
	(0.001)
Distance to Local CBD	0.010***
	(0.002)
N	128838
F	866.9
r2	0.663

Notes: Standard errors in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Figure 1.3

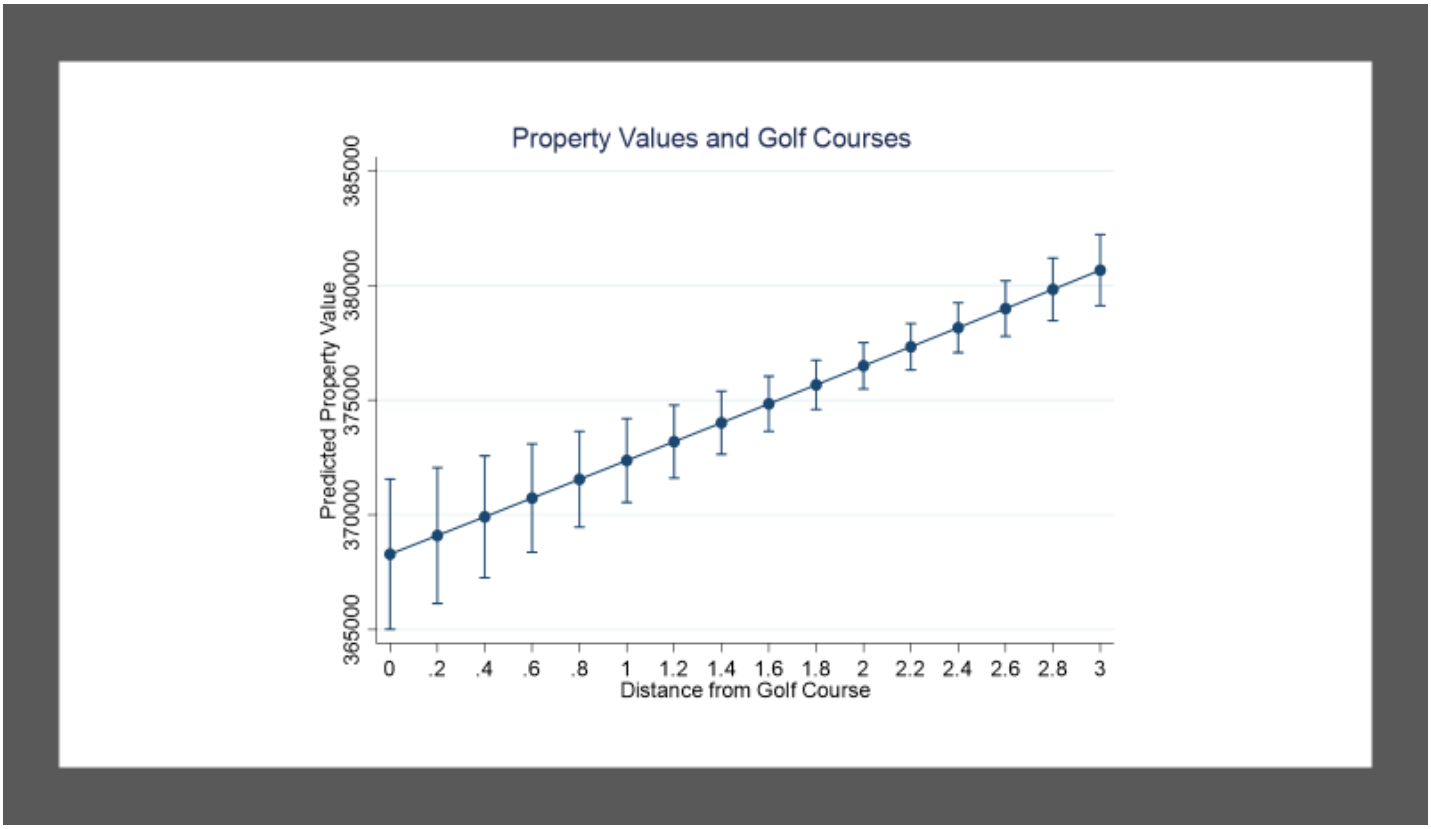


Figure 1.3 Depicts property value relative to distance from golf courses in King County. Property values are displayed non-logarithmically and measured in US dollars. Distance is measured in miles from closest park at the individual property level. Hedonic regression results show golf courses have a significant negative relationship with property values. This relationship appears to be linear, with housing values increasing at a rate of 1.2% per mile moving away from a golf course.

Figure 1.4

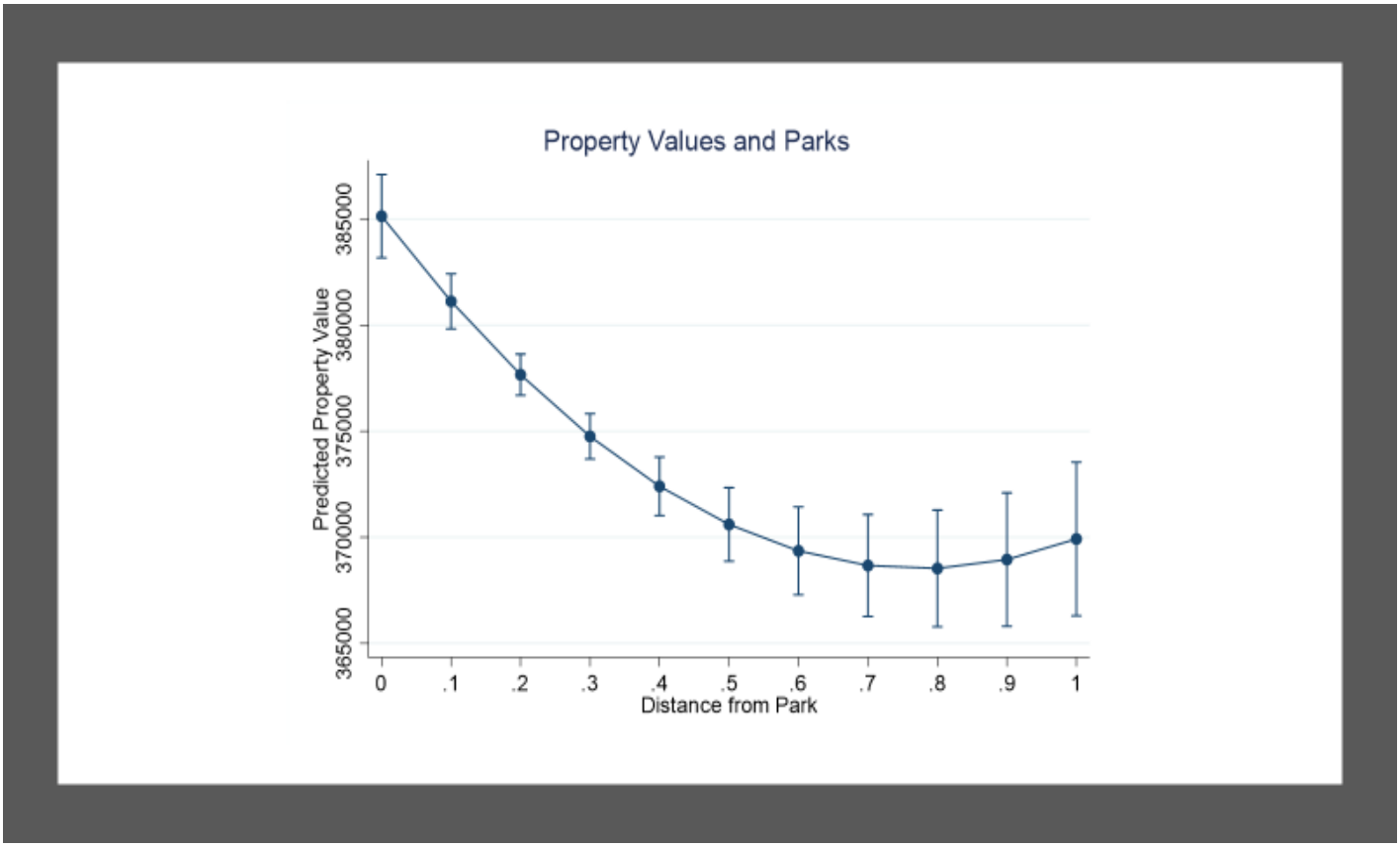


Figure 1.4 Depicts property values relative to distance from a park in King County. Property values are displayed non-logarithmically and measured in US dollars. Distance is measured in miles from closest park, at the individual property level. The greatest impact is within 0.25 miles of the park, as this is the distance that most people are willing to walk. Decay begins to flatten out after this point and turns approaching the 0.8 – 1-mile mark; property values begin to increase again approaching the next closest park, however variance also greatly increases at these distances.

Conclusion

The City of Bothell is a rapidly developing suburban center designated by the King County Growth Management Act (GMA) as a Core City. This designation means the City is obligated to plan for continued population growth. In December 2017, Bothell purchased Wayne Golf Course, seeking to add to the City's growing park space. The addition of Wayne created a 136-acre connected corridor of parks along the Sammamish River through downtown Bothell. This purchase came at initial cost to the City of 4 million dollars. A growing body of literature suggests that proximity to parks has positive impact on property values

I found that Bothell's Parks and Recreation Department draws from two funding sources within the City, the General Fund and the Capital Improvements fund. Real Estate Excise Tax Accounts for 14.3% of Capital Improvement fund Revenue, and Property Tax accounts for 26.22% of General Fund Revenue. Property values play a key role in providing revenue for both the City's funding sources. Based on hedonic regression analysis, I found that the park conversion project is likely to have a positive impact on surrounding property values, which is likely to partially offset the cost of the park conversion project. This has exciting implications for the city of Bothell, and other municipalities within King County.

I used a hedonic regression model to predict the impact of the Wayne Park conversion project on surrounding property values. The model showed a significant positive relationship between property values and proximity to parks. With property values increasing at a rate of 6.5% moving closer to a park. Both findings indicate that the conversion project will likely have a positive impact on surrounding home values up to about 0.8 miles away from the park, and

property values play a primary role in providing revenue to both of Bothell's Parks and Recreation Department budgets.

Finding that property values increase by 9.12 % per mile moving away from a golf course was surprising. Of the 37 golf courses included in the study, no distinction was made between public or private course, golf course size, or lot size. I have begun the work of sorting the golf courses by public vs private, club house, and amenities on site. I would like to continue this research and conduct another study where golf course privatization and on-site amenities are included in the hedonic model.

The City of Bothell sits on the border of Snohomish and King Counties; the northern half is in Snohomish County while the southern half is within King County. Wayne park is in the southern-most portion of Bothell, and the park is within King County. Using the King County assessor data, I was able to a build a model for King county, which is where the park is located. While this may be the most appropriate context for the ways in which property values may change as a result of the park conversion, the park's proximity to Snohomish County might result in a somewhat different range of values. Due to limitations in publicly available data, it was not possible to replicate this analysis for homes in Snohomish County. I would recommend future hedonic study of house values and proximity to parks in Snohomish County, with access to available property sale data from Snohomish County.

Urban parks vary in size and type. While some serve the primary purpose of providing outdoor recreation, others serve as habitat restoration sites. The hedonic model used in this paper does not account for variations in size or types of parks present in King County. It is possible that size of the park space as well as design may have in impact on the positive pricing

effect of the park itself. Future research should be done to explore this more fully and to determine if the types and size of parks have varying impacts on adjacent property values. As noted earlier, studies in this area indicate a positive relationship between park size and positive impact on property value. It is likely a study of King County would show an even greater impact for the properties surrounding the Wayne Park conversion.

Endnotes

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Appendix A

Table 1.3 Variable List

Name	*Description*
dist_park	Distance to closest park
dist_golf	Distance to golf course
Dist_lake	Distance to Lake
dist_seatt	Distance to Seattle
dist_cbd	Distance to local CBD
pct_black_afam	Percent of population - African American
pct_asian	Percent of population - Asian
pct_hisp	Percent of population - Hispanic
pct_other	Percent of population - Other
med_income	Median income of census tract
pop_dens	Population density
sqfttotliving	Square footage of residence
bedrooms	Number of bedrooms
bathfullcount	Number of Bathrooms
fpsinglestory	Single story property
fpmultistory	Multi Story property
age_at_sale	Age of property at time of sale
renov_at_sale	Years since last renovation
zip_id	Zip Code
schds_id	School District
sale_yr_mo_	Year and Month of Sale