Fiscal Impact of a Subdivision on Perry Farm

THE TAX BENEFITS OF OPEN SPACE PRESERVATION VS. RESIDENTIAL DEVELOPMENT

By Robert J. Johnston

Aquidneck Island Partnership

Realizing A Shared Island Vision

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Executive Summary[1]

This report summarizes the results of a fiscal impact analysis of a hypothetical 49-unit "Perry Farm Subdivision," and indicates the net fiscal benefits received by Middletown taxpayers as a result of the preservation of the Perry Farm property by the Aquidneck Island Land Trust and other community partners. The report considers all primary fiscal impacts over a 30-year time horizon, using state-of-the-art economic and fiscal impact models. The resulting analysis shows that over the next 30 years, residential development of the Perry property would cost Middletown taxpayers between $920,680 and $2,679,775 (in net discounted 1998 dollars), even after one considers all the tax and other revenues generated by new residential units. In total *non-discounted* dollars, current Middletown taxpayers would pay as much as $4,810,602 in additional taxes over the next 30 years if a 49-house subdivision were to be built on Perry Farm.[2] Considering only the most probable outcomes, the preservation agreement likely saved the taxpayers of Middletown between $1,671,614 and $2,089,378, in discounted tax dollars, over the next 30 years. In annual terms, this would translate to an additional $24 in property taxes paid by each Middletown household, each year, to support the additional net fiscal losses generated by a hypothetical Perry Farm subdivision. This report, along with a companion report discussing the fiscal impact of preserving the Kempenaar Valley parcels, illustrate the types of fiscal benefits that can be generated by actions which prevent large-scale residential subdivision of Middletown's remaining open space.

[1] Much of the wording of this report, as well as the description of fiscal impact analysis, is shared by the companion report "Fiscal Impact of a Subdivision on Kempenaar Valley: The Tax Benefits of Greenway Preservation vs. Residential Development." However, the analysis and results presented by this report are unique to the Kempenaar parcels (in the Middletown Town Center). The results of the Kempenaar study are summarized by Appendix Five.

[2] For information regarding discounting and its implications, see Appendix Three, Section #1.

The Current Situation in Middletown

The Town of Middletown comprises 8,438 acres of land on Aquidneck Island. As of 1990, the town supported a population of 19,460 residents and 7,104 housing units, representing a 10-year population growth of 13 percent and housing growth of 9.6 percent (Rhode Island Economic Development Corporation, 1998). Since 1990, development of new housing units has continued at a rapid pace, with 471 building permits issued during 1990-1997 (Rhode Island Builders Association and US Census Bureau). Aquidneck Island Geographic Information System (AIGIS) data for Middletown shows that at least 33 percent of the town is developed for residential uses, compared to less than 25 percent remaining in agricultural use and 9 percent in undeveloped forest/brushland (AIGIS 1997). Recent subdivisions have further increased the amount of low- to mid-density residential "sprawl." Along with this increase in residential housing has come a decrease in the amenities of farm, forest and open space land valued by local residents and visitors, and an increase in traffic and congestion (Johnston 1997). Although significant areas of Middletown retain the diverse, semi-agricultural character of a small New England coastal community, this character is threatened by ongoing residential development of remaining undeveloped open space and agricultural land.

Costs and Benefits of Residential Development vs. Open Space Preservation

In response to these changes, concerned citizens, businesses, non-profit organizations and the town government of Middletown have taken significant steps to preserve undeveloped land uses (Sweeney 1998; Ruggieri 1997a, b; O'Brien 1997a, b; Ottaviano 1997). Despite the many economic, ecological and other benefits that such actions provide to local residents (Johnston 1997), taxpayers occasionally question the fiscal impacts of policies which limit development. Taxpayer concern is often reflected in two common, yet generally false claims:

False Claim #1: Residential subdivisions and sprawl development will lower property taxes by increasing the tax base.

False Claim #2: Open space, including public parks, open fields, and productive forests and farmland are costly to local towns and lead to higher property taxes.

Illustrating the false and misleading nature of these claims, dozens of *Cost of Community Services* studies have demonstrated that residential land does *not* generate sufficient revenues to support its expenses, leading to a net fiscal loss for local communities. Open space, forests and farmland generate revenues in excess of their expenses, leading to a net fiscal benefit for local communities (Johnston 1997). Although residential development expands the gross tax base, tax revenue increases are almost always negated by even larger increases in the costs of public education (schools, libraries), public services (fire, police, snow plowing), and infrastructure (sewer, roads) generated by new housing.

A Fiscal Analysis Case Study: Preserving the Perry Family Farm

Despite the fiscal and tax benefits associated with open space preservation in general, taxpayers may wish to identify the fiscal impacts associated with the preservation of specific parcels of land. For example, in 1998 the Aquidneck Island Land Trust (AILT) brokered an agreement with public and private partners to preserve the Perry Farm, the largest remaining undeveloped parcel in Middletown. The Perry family was paid approximately $765,000 for the 82-acre parcel, 25 acres of which will now be farmed by the Newport Vineyards and Winery, while the remaining 55+ acres are planned for use as part of a proposed Newport National Golf Course (Sweeney 1998). As a result of the preservation agreement, development rights on all portions of the property will be extinguished. Although Middletown tax revenues were *not* used to purchase the Perry property, the preservation of this land will have important fiscal consequences for Middletown and its taxpayers. This report presents the results of a detailed fiscal impact analysis, designed to assess the fiscal impact of this effort to preserve a significant parcel of open space in Middletown.

To assess the fiscal impact of the AILT preservation agreement, this report compares the current condition of Middletown's public revenues and expenses to that which would occur if the Perry Farm were to be developed as residential housing—the almost certain outcome in the absence of the preservation agreement. It is assumed that the property would be developed as a typical subdivision, similar to other recent Middletown housing developments such as East Meadow, West Meadow and Kesson Farm. As is the case with existing subdivisions, the hypothetical "Perry subdivision" would have numerous impacts on public revenues and expenses. Ultimately, these impacts would result in a change in the property taxes paid by resident each year to the Town of Middletown. This report considers all primary fiscal impacts over a 30-year time horizon, using state-of-the-art economic and fiscal impact models. The result of this analysis shows that over the next 30 years, residential development of the Perry property would cost Middletown taxpayers between $920,680 and $2,679,775 (in net discounted 1998 dollars), even after one considers all the tax and other revenues generated by new residential units. In total non-discounted dollars, current Middletown taxpayers would pay as much as $4,810,602 in additional taxes over the next 30 years, if a 49-house subdivision were to be built on Perry Farm.

Mechanics of a Fiscal Impact Analysis: A Brief Overview

Fiscal Impact Methodologies

Fiscal Impact analysis compares the public costs and revenues generated by residential or commercial development (Burchell et al. 1994). Although fiscal impacts may be projected for any jurisdiction, the following analysis assesses public costs and revenues at the community (town) level. Various fiscal impact methods exist, each suited to specific types of development and sets of community characteristics. Despite differences in the exact methods used to forecast future costs and benefits of residential development, all fiscal impact methods share four basic steps (Burchell et al. 1994):

1] Determine the number of housing units and increase in population generated by the residential growth.

2] Translate housing unit and population increases into consequent annual changes in public service costs.

3] Forecast annual public revenues (taxes, fees, etc.) generated by the residential growth.

4] Compare new costs to new revenues over a selected time horizon. If costs exceed revenues, the development will generate a deficit (loss). If revenues exceed costs, the development will generate a surplus.

The current study combines the *case study method* and *fiscal multiplier method* of fiscal impact analysis, described by Burchell et al. (1994). The case study method relies on detailed site-specific interviews of public officials combined with intensive review of community budget information and department expenses to estimate the impacts of proposed development on public revenues and costs. The case study method assumes that capacity constraints and other factors will cause certain departments of community government to incur different relative cost increases as a result of residential development. The fiscal multiplier approach assumes a fixed-multiplier impact on department expenses, based on the percentage increase in population or housing units. Each method is most appropriate for specific types of community expenses and departments, depending on the characteristics of the community and of the specific expense(s) considered.

Modeling the Perry Farm Subdivision: A Build-Out Analysis

A formal build-out analysis of Perry Farm indicates that the property would support a 49-house subdivision of typical three-bedroom houses. This analysis accounts for the current zoning classification of the Perry property, the size of the parcel, the placement of roads and infrastructure, and wetland restrictions which would prevent building on certain parts of the property. The characteristics of new housing units, and thus the assessed value of these units, is modeled after recent subdivisions in Middletown.

Assessing Changes in Public Expenses

New housing units require town services, including police and fire protection, public schooling for children and other government services. Case study interviews and/or budget assessments were combined with fiscal multiplier methods to assess the resulting costs imposed on the Middletown school department, fire department, police department, public works department, sewer and water department, town support services and capital improvement budget. Together, these departments represent approximately 85 percent of all Middletown government expenses. New costs imposed on other departments, including the town clerk, town administrator, town planner and tax assessor, are estimated using fiscal multiplier methods and *fall back ratios*, as described in Appendix One.

Assessing Changes in Public Revenues

Changes in tax revenues are estimated based on the build-out analysis of the Perry Farm property (Hingorany 1998), combined with an analysis of tax revenues generated by recent Middletown subdivisions. Impact fees are estimated at $350 per housing unit. Other revenue impacts are

assessed using fiscal multiplier methods, as described by Burchell et al. (1994). Appendix Two details all calculations used to estimate revenues generated by a Perry Farm subdivision.

Accounting for Uncertainty: Sensitivity Analysis

This fiscal analysis relies on a scientific approach known as *sensitivity analysis* (Levy and Sarnat 1990). This approach is commonly applied when certain critical factors in an economic scenario (such as the discount rate or the assessed value of new houses) are unknown. Rather than imposing one (almost certainly incorrect) value for these unknown factors, a sensitivity analysis estimates fiscal impact given a wide range of possible values for these factors. For example, depending on the discount rate and the assessed value of new homes, a Perry Farm subdivision could generate a net loss of between $920,680 and $2,679,775 (in discounted 1998 dollars). A sensitivity analysis calculates fiscal impact for this full range of potential values, allowing policy makers to assess the fiscal impact at various assessment levels and discount rates.

Impacts Not Included in a Fiscal Impact Analysis

Fiscal impact analysis is a well-defined tool considering only "net local public costs and revenues" (Burchell and Listokin 1983), as reflected in taxes paid by local property owners. Fiscal impact analysis does *not* consider numerous important economic, environmental, equity, quality-of-life and other impacts which often accompany new development. In many cases, these other impacts provide an even stronger argument for open space and farmland preservation (Johnston 1997, National Park Service 1995). This analysis also ignores "secondary impacts" of residential development, such as wages paid to construction workers and money spent by new residents at local shops. Although secondary impacts are sometimes (incorrectly) included in simplified applications of benefit-cost analysis, it is well-established that inclusion of such impacts is inappropriate, and leads to biased benefit-cost estimates (Sassone and Schaffer 1978).

Fiscal Impact Analysis of a Hypothetical Subdivision of Perry Farm: Results

Details of fiscal impact methodology and calculation are described in Appendices One, Two and Three. Costs are calculated based on a 49-unit development of standard three-bedroom homes, each valued between $150,000 and $190,000. It is assumed that build-out and purchase of new homes would occur over four years, in even 25 percent increments (12.25 homes are built and purchased each year, until all 49 homes are occupied in the fourth year). Based on standardized demographic multipliers, a typical three-bedroom home in New England houses an average of 3.3163 residents, and places 0.7792 children in local schools (Burchill et al. 1994). Accordingly, the Perry subdivision is assumed to generate approximately 38 school age children and 162 total residents. All infrastructure is assumed to be paid by housing developers, who in addition pay a $350 per unit impact fee to the town. However, it is assumed that the town would provide basic services to these new residential units, including public schooling, police, fire, water, sewer and street maintenance (plowing, sweeping). Residential units are assumed to generate taxes at Middletown's current tax rate ($16.60 per thousand of assessed value), and to pay a share of town fees as described by Appendix Two. Residential units are also assumed to pay for all water and sewer services used, except for "overage charges" spread across all system users.[3]

[3] Overage charges are fees charged to the Town of Middletown by the City of Newport, based on each day that Middletown's use of the Newport sewage treatment facilities exceed contractual limits. These fees are spread across all users of the sewer system.

Fiscal costs and benefits are assessed over a 30-year time horizon, at discount rates ranging from 4 percent to 12 percent. Non-discounted impacts (0 percent discount rate) are also presented. The 30-year time horizon is chosen as it is the typical time span of mortgage payments on new housing units. Discount rates indicate the rate of time preference of the community, and account for the fact that future impacts are generally valued less than present impacts. Higher discount rates force a lower valuation of future fiscal impacts, as described by Levy and Sarnatt (1990).

Tables 1, 2 and 3 illustrate the estimated net fiscal impact of the hypothetical Perry subdivision, accounting for all probable and foreseeable fiscal revenues and costs. Table 1 illustrates fiscal impacts based on a $190,000 per unit assessment. Table 2 illustrates fiscal impacts based on a $170,000 per unit assessment. Table 3 illustrates fiscal impacts based on a $150,000 per unit assessment. Each table illustrates fiscal impact for a range of discount rates from 4 percent to 12 percent per year (in 1998 dollars), together with the total non-discounted impact. *Note that in all cases, the net fiscal impact is negative—the lowest possible net loss associated with the hypothetical Perry subdivision is over $920,000.* As all net impacts are losses, the *fiscal impact estimates may be interpreted as additional tax revenues that would have to be paid by current Middletown residents, to help pay the excess community costs associated with a new subdivision.*

Fiscal Impacts Charts: Losses Associated with modeled Perry Farm Subdivision

Each of the following tables shows net fiscal losses for discount rates ranging from 4 percent to 12 percent. In addition, the 0 percent column illustrates the "raw fiscal impact," or the total number of dollars lost over the 30-year time horizon, if one does not discount future cash flows. Discounting accounts for the fact that current benefits and costs are valued more highly than future benefits and costs, and allows economists to compare present and future fiscal impacts. Accordingly, the numbers presented in this report reflect the discounting of future impacts at between 4 percent and 12 percent. For additional information regarding discounting, see Appendix Three.

Table 1. Net Fiscal *Losses* Generated by 49-House Perry Farm Subdivision
Case I: $190,000 Per-House Assessment, 30 Year Impact

Table 2. Net Fiscal *Losses* Generated by 49-House Perry Farm Subdivision
Case II: $170,000 Per-House Assessment, 30 Year Impact

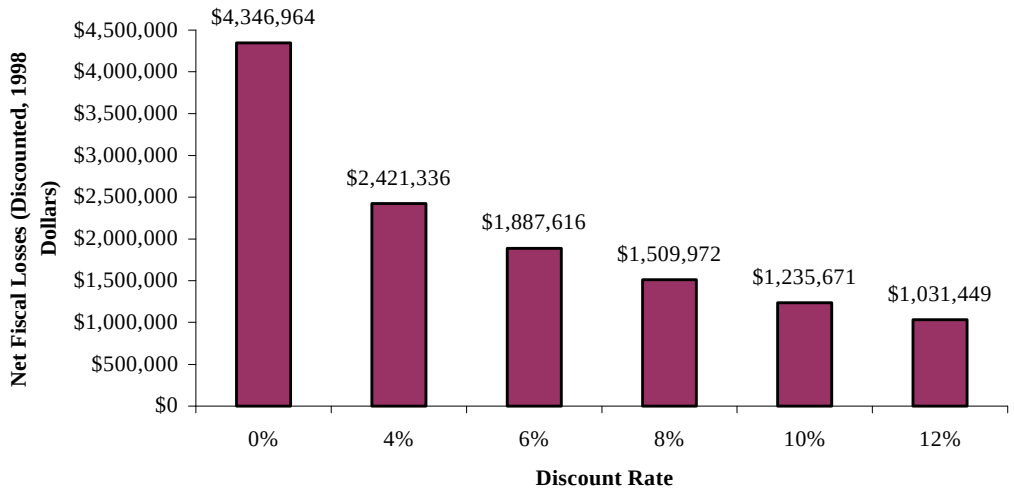

Table 3. Net Fiscal *Losses* Generated by 49-House Perry Farm Subdivision
Case III: $150,000 Per-House Assessment, 30 Year Impact

The above tables show a range of possible impacts associated with the hypothetical Perry Farm subdivision scenario. However, some are more probable and realistic than others. Although it is impossible to predict hypothetical future events with certainty, it is possible to identify the most likely, or most realistic scenarios based on a few simple assumptions and pieces of information. First, based on the price of homes in recent Middletown subdivisions, it seems most likely that the homes built on a Perry Farm subdivision would be aimed at the "entry home" market, and

thus priced relatively close to the $150,000 benchmark. Second, most economic and fiscal analysis use specific money market indicators to set discount rates, including the federal funds rate and/or the prime rate. As of September 8, 1998 the federal funds rate was 5.66 percent, while the prime rate was 8.5 percent. Given these two indicators, it is likely that the "real" discount rate of society is between 6 percent and 8 percent. Accordingly, the most likely fiscal impact of a 49-house Perry Farm subdivision would be a loss of between $1,671,614 and $2,089,378. Assuming that this fiscal loss would be balanced (or offset) by charging a higher tax rate to all Middletown taxpayers, this translates to between $254 and $317 in additional real tax costs for every Middletown household, discounted over a 30-year period. In nominal (non-discounted) tax dollars, each Middletown house would pay an additional $24 in property taxes each year to support the additional net fiscal losses generated by the Perry subdivision.

Summary

This report summarizes the results of a fiscal impact analysis of a hypothetical "Perry Farm Subdivision," and indicates the net fiscal benefits received by Middletown taxpayers as a result of the preservation of the Perry Farm property. In return for the $765,000 investment of private and state funds required to purchase and preserve the property, the Aquidneck Island Land Trust likely saved the taxpayers of Middletown between $1,671,614 and $2,089,378. This savings represents excess community costs that would have been generated by residential development of Perry Farm, over and above all resulting tax revenues. In annual terms, this would translate to an additional $24 in property taxes paid by each Middletown household, each year, to support the additional net fiscal losses generated by an hypothetical Perry Farm subdivision.

Data Sources and Citations

Data Sources

- Middletown Revenue and Expenditure Report, 1998-1999 (Town Budget).
- Middletown Fire Department 1997 Annual Report
- Dispatch Log, Middletown Police Department, 1998
- Assessments for Farm, Forest, and Open Space Land, Town of Middletown, 1998
- Build-out analysis of Perry Farm, 1998 (Hingorany 1998).
- School Department Expenses and Revenues, 1998.
- Interview with Police Chief William J. Burns
- Interview with Fire Chief David Carlisle
- Interviews (4) with Town Administrator Michael E. Embury
- Phone Interview with Richard Younken, Newport Collaborative Architects
- Data from Middletown Tax Assessor's Office (William H. Shorey, Assessor)
- Rhode Island Geographic Information System maps and data (RIGIS) of Middletown and Perry Farm, updated 1994. Provided by Mapping and Planning Services, Jamestown, Rhode Island.
- Rhode Island Builders Association and US Bureau of the Census, 1998 Data: New Housing Permits Registered for Middletown, Rhode Island. Provided by Mapping and Planning Services, Jamestown, Rhode Island.
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Sweeney, P. 1998. "Land trust to purchase Perry Farm." Newport Daily News, 4/22/98.

Appendix One: Cost Calculations

Costs were calculated based on a 49-unit subdivision of typical three-bedroom houses. This represents an increase of 1.05 percent in the number of developed residential parcels in Middletown. Using demographic multipliers for New England (Burchill et al. 1994), the 49 houses are assumed to generate approximately 162 residents and 38 school children, representing a 0.84 percent increase in population. For all town departments except the fire, public works, sewer and water, and school departments, increases in costs were assessed in two steps:

1] Calculate total department expense related solely to residential development in Middletown.

2] Estimate the increase in these residential expenses that would be caused by the new subdivision.

Estimation of the percentage of departmental expenses related to residential development (Step 1) was either calculated based on in-depth analysis of departmental budgets and interviews with town officials, or was calculated based on various *fall back ratios*. Fall back ratios are "default" means of establishing residential costs, when no other objective means is practical or possible. The two fall back ratios used in fiscal calculations, as well as the departments to which they are applied are illustrated in Table A-1. Residential expenses for those departments not mentioned in Table A-1 were calculated using case study interviews and in-depth budget analysis, as described by Burchell et al. (1994). For example, the percentage of police expenses allocated to residential property was calculated through interviews with the police chief, together with in-depth analysis of the computer logs of police activity during 1998. Residential expenses for the fire department were allocated in a similar fashion.

Table A-1. Fall Back Ratios Used to Estimate the Percentage of a Department's Expenses Related to Developed Residential Property.

Fall Back Ratio	Calculation Method	Resulting Percent of Expenditures Classified "Residential"	Departments / Budget Items to Which Ratio is Applied
Standard COCS	Ratio = (Total Assessment of Residential Property) ÷ (Total Assessment of All Town Property)	69.68%	Benefits, Boards, Contingencies, Finance, Insurance, Municipal Court, Principal and Interest, Town Administrator, Town Clerk, Town Council, Town Solicitor
Parcel-Based	Ratio = (Number of Developed Residential Parcels) ÷ (Total Number of Land Parcels in Town)	69.39%	Building Inspector, Planning, Tax Assessor

In most cases, the percentage increase in departmental residential expenditures (Step 2) was based on either the percentage increase in housing units generated by the subdivision (1.05 percent), or the percentage increase in population generated by the subdivision (0.84 percent). However, for the fire, public works, sewer and water, and school departments, additional calculations were needed, based on required purchases of new capital equipment or other considerations. Calculations used to estimate annual increases in costs for each town department are described by Table A-2. Note that Table A-2 provides only a brief summary of the much more extensive spreadsheet used for actual calculations.

Table A-2. Summary of Fiscal Cost Impacts and Calculation Methods

Budget Line	Percent of Total Town Expenses	Percent of Department Expenses Related to Developed Residential Property	Methods Used to Estimate Cost Increase of Residential Share	Departmental Cost Increase Generated by Perry Subdivision
Education	67.95%	100.00% (Case-Study Calculation)	Multiply estimated number of added school children by town school cost per child ($4969.57)	$174,253.01
Benefits	7.61%	69.68% (COCS Fall Back Ratio)	Calculation based on percent increase in residential parcels	$17,165.12
Boards	0.79%	69.68% (COCS Fall Back Ratio)	Calculation based on percent increase in residential parcels	$1,774.27
Building Inspector	0.41%	69.39% (Parcel Fall Back Ratio)	Calculation based on percent increase in residential parcels	$913.73
Canvassing	0.14%	100.00% (Case-Study Calculation)	Calculation based on percent increase in residential parcels	$446.92
Contingencies	0.37%	69.68% (COCS Fall Back Ratio)	Calculation based on percent increase in residential parcels	$844.15
Finance	0.64%	69.68% (COCS Fall Back Ratio)	Calculation based on percent increase in residential parcels	$1,434.82
Fire	4.65%	74.27% (Case-Study Calculation)	Calculation based on percent increase in residential parcels, plus amortized share of capital cost of new pumper truck.	$11,396.55
Insurance	0.32%	69.68% (COCS Fall Back Ratio)	Calculation based on percent increase in residential parcels	$723.36
Municipal Court	0.07%	69.68% (COCS Fall Back Ratio)	Calculation based on percent increase in residential parcels	$164.29
Planning	0.13%	69.39% (Parcel Fall Back Ratio)	Calculation based on percent increase in residential parcels	$283.56
Police	6.06%	80.50% (Case-Study Calculation)	Calculation based on percent increase in residential parcels	$15,797.49
Principal and Interest	1.15%	69.68% (COCS Fall Back Ratio)	Calculation based on percent increase in residential parcels	$2,581.77
Probate	0.02%	100.00% (Case-Study Calculation)	Calculation based on percent	$55.71

			increase in residential parcels	
Public Works	1.17%	69.39% (Parcel Fall Back Ratio)	Estimated cost of manpower and machinery required to service new 49 unit subdivision.	$17,328.53
Senior Center	0.17%	100.00% (Case-Study Calculation)	Calculation based on percent increase in population	$424.82
Support Services	2.88%	71.24% (Case-Study Calculation)	Calculation based on percent increase in residential parcels	$6,642.41
Tax Assessor	0.36%	69.39% (Parcel Fall Back Ratio)	Calculation based on percent increase in residential parcels	$802.76
Town Admin	0.40%	69.68% (COCS Fall Back Ratio)	Calculation based on percent increase in residential parcels	$896.70
Town Clerk	0.46%	69.68% (COCS Fall Back Ratio)	Calculation based on percent increase in residential parcels	$1,042.80
Town Council	0.06%	69.68% (COCS Fall Back Ratio)	Calculation based on percent increase in residential parcels	$139.68
Town Library	1.61%	100.00% (Case-Study Calculation)	Calculation based on percent increase in population	$4,109.53
Town Solicitor	0.36%	69.68% (COCS Fall Back Ratio)	Calculation based on percent increase in residential parcels	$811.52
Capital Improvement	2.24%	84.91% (Case-Study Calculation)	Calculation based on percent increase in residential parcels	$6,146.33
Sewer and Water Fund	NA	NA	Based on City of Newport overage charge spread over all system users	$1,172.80
Current Net Revenues from Perry Farm	NA	NA	Current tax revenues from Perry Farm minus estimated community costs.	$5,638.65

Based on calculations summarized above, the total annual (nominal) fiscal cost generated by the hypothetical Perry subdivision is estimated to be $295,326. This number, however, is subject to discounting prior to the calculation of final impacts, as discussed in Appendix Three.

Appendix Two: Revenue Calculations

Revenue calculations are relatively straightforward, based on the assumed value of each new unit in the hypothetical subdivision. Tax revenues are calculated at the current Middletown rate of $16.60 per thousand of assessed value for each of the 49 units. Assumed values range from $150,000 per unit, which generates a total of $122,010 in tax revenues, to $190,000 per unit, which generates $154,546 in tax revenues. These values are based on those of recent Middletown subdivisions, mostly aimed at the "entry-home" market. The new units are also assumed to produce increases in licenses, fees and departmental town revenues. Based on an analysis of these revenue sources and the size of the hypothetical subdivision relative to existing residential development in Middletown, this non-tax revenue increase is estimated to be approximately $3,977 per year. In total, annual revenues from the hypothetical subdivision range from $125,987 to $158,523, depending on the assessed value of housing units. In addition, each of the new housing units is assumed to pay a one-time impact fee of $350 to the town. Finally, payments for water and sewer services are assumed to cover all costs of these services, except for overage charges that are distributed across all system users. See Footnote 1 on page one in the main text for a brief description of overage charges.

Nominal annual revenues from the subdivision are assumed constant over the 30-year time horizon of the model, with the exception of the impact fee discussed above. However, these revenues are discounted prior to calculation of final net impacts, as discussed in Appendix Three.

Appendix Three: Calculation of Net Benefits

Final calculation of net fiscal impact, in its simplest form, simply requires subtraction of annual costs from benefits, summed over all years considered, where costs and benefit calculations are summarized above. In this analysis, net impacts are summed over a 30-year time horizon. In addition to these simple calculations, the analysis also accounts for a variety of factors which complicate the model:

1. This fiscal impact analysis assesses discounted benefits over a 30-year time horizon, at various rates of discount (4 percent to 12 percent). This generates the present value of all future fiscal impacts, in 1998 dollars, over the 30-year time horizon considered. Discounting accounts for the fact that current benefits and costs are valued more highly than future benefits and costs, and allows economists to compare present and future fiscal impacts. For example, a 4 percent discount rate implies that $1 received one year from today is worth 4 percent less than $1 received today ($1÷1.04). At the same discount rate, $1 received two years from today is worth 8.16 percent less than $1 received today ($1÷1.04^2). Total discounted impacts are calculated by "discounting" future impacts by the chosen discount rate, as shown above, then adding the annual discounted impacts for each year considered. Non-discounted impacts are calculated through simple addition of all annual impacts, without discounting. This is equivalent to an assumption of a 0 percent discount rate. For those interested in additional mechanics and details of discounting and present value calculation, see Levy and Sarnatt (1990).

2. The full set of 49 housing units would not be constructed and occupied during a the first year of development. Therefore, the model must allow for an "absorption period" during which the new units are built and occupied. This model assumes a four-year absorption period, and an even 25 percent increase in occupied units each year. To assess fiscal impact for years one through four, annual fiscal impact is calculated assuming 100 percent absorption, then multiplied by the percentage of houses actually assumed built by a specific year. For example, for every $100 of fiscal impact that would occur if all (100 percent) of the 49 houses were built and occupied, only $25 dollars (or 25 percent) of impact will occur during year one, when only 25 percent of the houses are assumed built and occupied. This percentage rises by 25 percent each year, until full absorption is reached in year four. Note that the model also discounts net impacts in years one through four, as described above.

3. The model assumes that the annual (nominal) value of revenues and costs will remain constant over the 30 year time horizon of the analysis, subject to the allowance for the absorption period. The only exception is the impact fee of $350 per unit, which is assumed to be paid as the houses are built. For the case of new capital goods (such as trucks and capital equipment), the model calculates the yearly payment that would be charged to finance the purchase, at a 7 percent interest rate, then assesses the share of this payment attributable to the new development (generally 1.05 percent, based on the percentage increase in developed residential parcels).

4. Table A-3 illustrates the yearly impacts, and the total net (30 year) impact, as calculated by the model spreadsheet. The illustrated numbers are generated by the model in which houses are assumed valued at $150,000. Note that results for the full range of discount rates are shown. Also note that these results are net impacts for each year, calculated by subtracting discounted costs from discounted benefits. Calculations for years one through four also account for the absorption period discussed above. Similar spreadsheets are used to calculate net fiscal impacts in the $170,000 and $190,000 assessment cases, generating the results shown in the main text.

Table A-3. Final Fiscal Impact Table
Case III. $150,000 Per-House Assessment, Thirty Year Horizon

		Discounted Net Fiscal Impacts				
	Build Out	Discount Rate				
Year		4%	6%	8%	10%	12%
0	**0% Built**	$0	$0	$0	$0	$0
1	**25% Built**	-$40,785	-$40,015	-$39,274	-$38,560	-$37,871
2	**50% Built**	-$78,432	-$75,500	-$72,730	-$70,109	-$67,627
3	**75% Built**	-$113,123	-$106,840	-$101,013	-$95,603	-$90,572
4	**100% Built**	-$145,029	-$134,390	-$124,708	-$115,883	-$107,824
5		-$139,451	-$126,783	-$115,470	-$105,348	-$96,272
6		-$134,088	-$119,606	-$106,917	-$95,771	-$85,957
7		-$128,931	-$112,836	-$98,997	-$87,064	-$76,747
8		-$123,972	-$106,449	-$91,664	-$79,149	-$68,524
9		-$119,204	-$100,424	-$84,874	-$71,954	-$61,182
10		-$114,619	-$94,739	-$78,587	-$65,413	-$54,627
11		-$110,210	-$89,377	-$72,766	-$59,466	-$48,774
12		-$105,971	-$84,318	-$67,376	-$54,060	-$43,548
13		-$101,896	-$79,545	-$62,385	-$49,146	-$38,883
14		-$97,977	-$75,042	-$57,764	-$44,678	-$34,717
15		-$94,208	-$70,795	-$53,485	-$40,616	-$30,997
16		-$90,585	-$66,788	-$49,523	-$36,924	-$27,676
17		-$87,101	-$63,007	-$45,855	-$33,567	-$24,711
18		-$83,751	-$59,441	-$42,458	-$30,516	-$22,063
19		-$80,530	-$56,076	-$39,313	-$27,741	-$19,699
20		-$77,432	-$52,902	-$36,401	-$25,219	-$17,588
21		-$74,454	-$49,908	-$33,705	-$22,927	-$15,704
22		-$71,591	-$47,083	-$31,208	-$20,843	-$14,021
23		-$68,837	-$44,418	-$28,896	-$18,948	-$12,519
24		-$66,189	-$41,903	-$26,756	-$17,225	-$11,178
25		-$63,644	-$39,531	-$24,774	-$15,659	-$9,980
26		-$61,196	-$37,294	-$22,939	-$14,236	-$8,911
27		-$58,842	-$35,183	-$21,240	-$12,942	-$7,956
28		-$56,579	-$33,191	-$19,666	-$11,765	-$7,104
29		-$54,403	-$31,313	-$18,210	-$10,696	-$6,343
30		-$52,311	-$29,540	-$16,861	-$9,723	-$5,663
		-$2,695,338	**-$2,104,234**	**-$1,685,815**	**-$1,381,749**	**-$1,155,240**

Impact Fee	$15,563	$14,856	$14,201	$13,591	$13,022
Net Fiscal Impact (1998 dollars)	**-$2,679,775**	**-$2,089,378**	**-$1,671,614**	**-$1,368,158**	**-$1,142,218**

Appendix Four. Summary of the Companion Fiscal Analysis Report, "Fiscal Impact of a Subdivision on the Kempenaar Valley: The Tax Benefits of Greenway Preservation vs. Residential Development"

This companion report, "Fiscal Impact of a Subdivision on the Kempenaar Valley: The Tax Benefits of Greenway Preservation vs. Residential Development," summarizes the results of a fiscal impact analysis of an hypothetical 55-unit "Kempenaar Valley subdivision," and indicates the net fiscal benefits that would be received by Middletown taxpayers as a result of the preservation of the two Kempenaar Valley properties as open space. Employing the same basic methodology used to assess fiscal impacts of a Perry Farm subdivision, the analysis shows that over the next 30 years, residential development of the Kempenaar Valley properties would cost Middletown taxpayers between $1,065,754 and $3,083,359 (in net discounted 1998 dollars), even after one considers all the tax and other revenues generated by new residential units. In total non-discounted dollars, current Middletown taxpayers would pay as much as $5,545,393 in additional taxes over the next 30 years, if a 55-house subdivision were to be built in the Kempenaar Valley. Considering only the most probable outcomes, preservation of the Kempenaar Valley would likely save the taxpayers of Middletown between $1,923,491 and $2,404,122, in discounted tax dollars over the next 30 years. In annual terms, this would translate to an additional $28 in property taxes paid by each Middletown household, each year, to support the additional net fiscal losses generated by a hypothetical Kempenaar Valley subdivision in the Middletown Town Center. The results of the Kempenaar Valley study are summarized by the following tables.

Fiscal Impact Charts: Losses Associated with Modeled Kempenaar Valley Subdivision

Table 1. Net Fiscal *Losses* Generated by 55-House Kempenaar Valley Subdivision
Case I: $190,000 Per-House Assessment, 30 Year Impact

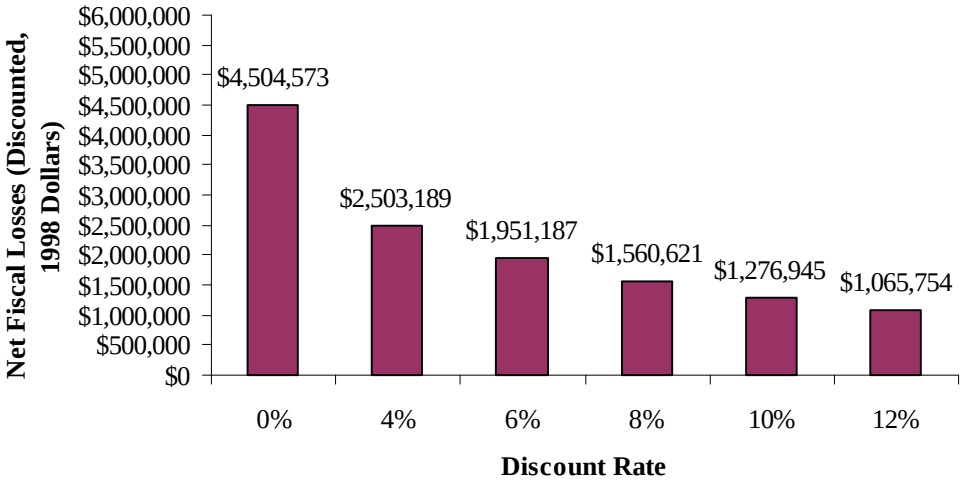

Table 2. Net Fiscal *Losses* Generated by 55-House Kempenaar Valley Subdivision
Case II: $170,000 Per-House Assessment, 30 Year Impact

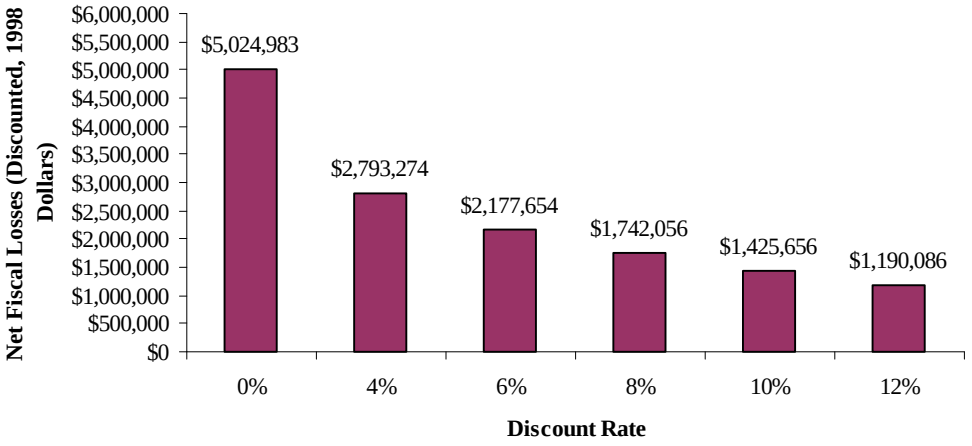

Table 3. Net Fiscal *Losses* Generated by 55-House Kempenaar Valley Subdivision
Case III: $150,000 Per-House Assessment, 30 Year Impact