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Municipal Data Analysis

Introduction

This task discusses the Excel-based financial model that has been developed by the Devens Disposition Executive Board (DDEB) Finance and Development Committee, which will be used to evaluate development alternatives from a fiscal and economic perspective. The objective of this component of the Consultant's assignment was to review the accuracy and design of the model and to point out possible improvements that can be made to assist the DDEB in its decision-making. The DDEB has been charged with analyzing and evaluating the disposition of Devens from MassDevelopment, with the goal of bringing a recommendation to the voters of the host communities in November 2006.

The task assignment also calls for running the model in order to analyze different disposition alternatives. This step will be completed once the model is updated based on this review.

DDEB Financial Model

Overall, the financial model consists of several inter-related spreadsheets that collect a large amount of quantitative information on the fiscal operations of the host communities as well as residential and commercial/industrial real estate market conditions. This information is based on a series of *assumptions* that the model uses to forecast how Devens would operate either as a stand-alone community or if it is integrated back into the surrounding host communities. The goal of the model is to predict, as accurately as possible, the impact of development at Devens on the towns of Ayer, Harvard and Shirley and/or on the residents and taxpayers of Devens, with a focus on the long-term sustainability of the development.

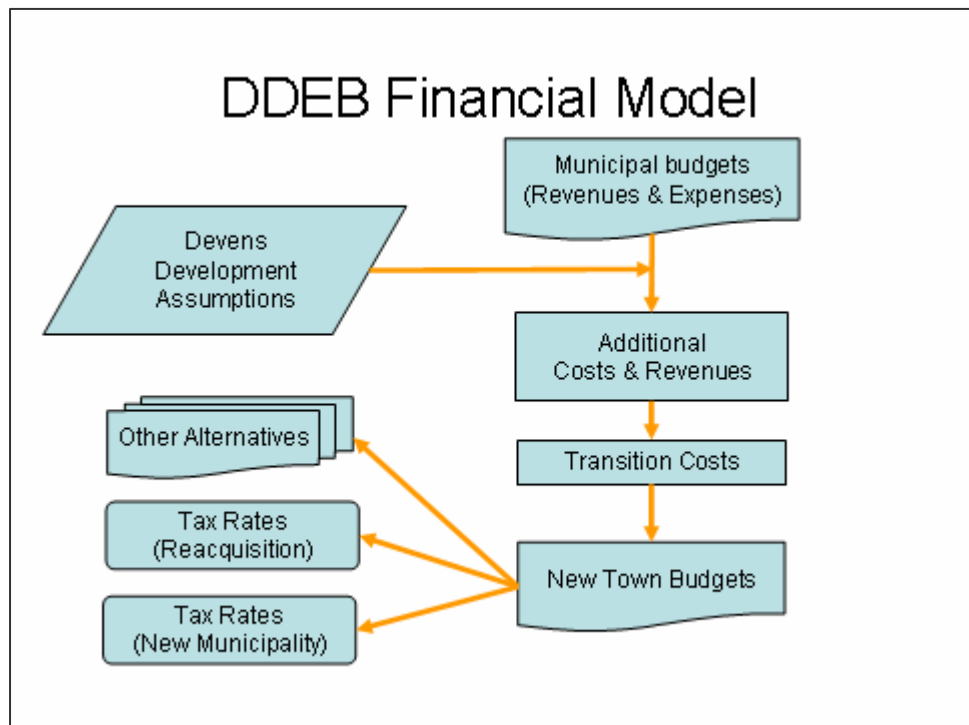
The financial model has been in development by several members of the Committee since 2003 and has gone through numerous revisions, each of which introduced new information, analyses or formatting. The most recent edition, Version 6.0, was created in May 2005 and includes a more 'user-friendly' interface. The model analyzes two basic scenarios:

- Scenario 1: Devens assimilated as part of the respective host communities, or
- Scenario 2: Devens as a stand-alone municipality.

Although complex, the financial model is a reasonable approach to accurately estimating the impacts of current and future growth and development at Devens. The DDEB Financial Model attempts to analyze the impacts of future development at Devens by forecasting changes in municipal revenues and expenses that would likely occur under either of the two basic alternatives. The model is very complex, with a large number of assumptions, data points and calculations. It is also a “static” model, in that it measures changes as if they occur all at once. In order to predict how changes would occur over time, different assumptions need to be entered and the model re-run.

Devens is currently owned and operated by MassDevelopment, which provides typical municipal services to residents and businesses. These services are either provided directly or are contracted in whole or in part to surrounding communities (such as education). Property taxes are assessed on privately owned real and personal property as well as non-tax based sources of revenues such as fees, fines and grants to help offset these costs.

Figure 3.0



Model Design

The model, which is constructed using Microsoft Excel spreadsheet software, consists of approximately 30 separate worksheets, not all of which are linked to others. Many of them are detailed summaries of specific cost centers/budget line items, such as Education or Public Works, for each community, while others provide a list of the data that is entered as assumptions elsewhere in the model. The two key worksheets include the Development and Summary pages/tabs in which most of the primary assumptions are captured and the impacts calculated. There is also a worksheet that provides the history of the model and its various versions, and a worksheet that attempts to capture the baseline assumptions and data from each of the jurisdictions. The flowchart on the previous page shows the basic steps used in the financial model to estimate the impact of various development scenarios or alternatives.

The basic layout for the model starts with the financial statements of each of the host communities, as reported to the state for tax setting purposes. These include revenues from property taxes, state aid and other sources along with budgeted operating costs and capital expenditures. For the scenario in which Devens remains divided among the host communities, the incremental revenues and costs incurred to service each town's respective property at Devens is added. The tax base (assessed property) for the entire town including Devens is recalculated and a new property tax rate determined. For the second alternative (Devens as a standalone community), a summary municipal budget is compiled from the various other worksheets and a property tax rate is calculated. As the major source of revenues, property taxes are estimated based on type of use (commercial, industrial or residential) and the assessed values for each are estimated using different methodologies.

The amount of real estate by type of use (square feet of building, acres of land, number of residential units) is estimated on the Development worksheet which includes an inventory of all existing parcels at Devens along with the use and value for each. Different assumptions about future development (additional residential units, for example) are entered in this part of the financial model. Since the worksheet is arranged on a parcel by parcel basis and includes location (town), size, existing use/SF, zoning, development potential and other information, it is relatively easy to change how a parcel might be used in the future - such as by changing a parcel's zoning from industrial use to residential) - in order to create a new scenario and analyze the impact from it. By assigning each parcel to the particular town in which it is currently located or to "Devens" (which can be done by simply clicking on a button), the model can be switched between Scenario 1 and Scenario 2. This feature can also be used to analyze the impact of changing municipal boundaries, should the DDEB decide to consider such an option.



Model Inputs and Assumptions

The DDEB Financial Model includes several cells in different worksheets where data can be entered. This is largely due to the collaborative approach used to develop the model. Because of the risk of overlooking one or more key inputs, this issue should be resolved by creating a single data entry worksheet and/or by uniquely identifying each input (by cell/text color or other means). Doing so will limit the potential for overlooking key assumptions.

The following sections describe each of the model's worksheets and the inputs and assumptions used in each. Where appropriate, commentary is provided relative to the utility of each worksheet.

Revision History

This first tab in the model simply lists and describes each of the successor versions of the model.

Jurisdictions & Assumptions

This worksheet provides detailed support for the cost and revenue assumptions utilized in the model. It includes a column for each community and sections for the different municipal services (police, fire, emergency medical services, etc.) with the number of personnel or items needed to service Devens. Entering data here (such as the number of additional clerks or firefighters each community needs to service Devens) is supposed to automatically update another worksheets that calculate the costs associated with this particular function which in turn updates the Summary worksheet. For example, under section 6.0 – Public Works, the current version indicates that Harvard will require one additional supervisor (the number 1 is entered in the specific cell). This then updates a spreadsheet on the Public Works worksheet (Pink Tabs – see below) that calculates the cost based on assumed salary and benefits for this particular job type.

The data input methodology on this worksheet is not consistent, as some entries do not update other worksheets while others are updated from original data entered on other worksheets.

Summary

The Summary worksheet is the capstone of the Devens Financial Model, where the input and assumptions from the other worksheets are brought together to calculate the impact on each community. It consists of six sections – one for each of the three host communities plus Devens, an assessment summary and a residential analysis

calculator. The worksheet is set up so that either disposition scenario can be chosen by clicking a button – if Scenario 1 is chosen, the Devens spreadsheet is grayed out (hidden) and only the three town worksheets are shown, and if Scenario 2 is chosen, only the Devens spreadsheet is shown. This spreadsheet also allows the additional Devens costs and revenues along with transition costs to be included/excluded by checking or unchecking boxes at the top of the spreadsheet.

The Residential Price Calculator simply multiplies the number of current and potential housing units by an average price to get total assessed value and average value per housing unit. The totals are then used in the assessment summary and individual town spreadsheets.

The assessment summary spreadsheet brings the residential data along with commercial and industrial information from the Development Worksheet to estimate total assessed value by jurisdiction. Commercial and industrial values are calculated by capitalizing estimated rental rates using a 9% rate. The value of non-residential personal property, which is taxable in Massachusetts, is estimated based on outside data from other communities that has been statistically analyzed. This spreadsheet also totals projected population of residents and students based on the number of residential units input from the Development worksheet and factors applied from various sources.

The individual town spreadsheets included in the Summary worksheet take data from several of the other worksheets and spreadsheets to calculate the effective property tax rates for each community with the added revenues and costs of Devens added in. Existing tax revenues and town expenses are entered from outside sources (Recap Sheets, in this case) along with the incremental revenues and costs calculated in other parts of the model (the Pink tabs, see below). Assessed values are then summarized and used to calculate a new, combined, tax rate. The model includes a routine to split the tax rate between commercial/industrial/personal property rates and residential rates.

Development

The Development worksheet is an inventory of all of the developable parcels at Devens and lists information on size, type of use, building size and value, location (town) and additional development potential. It is the primary input to the rest of the Financial Model in that the ultimate development capacity, and hence revenue limit, is calculated here. If changes to the development plan or pattern is desired, this spreadsheet permits changes to the baseline to be made.

Pink Tabs

This series of 11 worksheets contain detail on the following specific municipal service functions for each community and Devens.

- Transition Costs
- Revenue
- General Government
- Police
- Public Works
- Fire
- EMS (emergency medical services)
- Dispatch
- Inspectors
- Education
- Human Services

Each worksheet provides data on personnel and expense costs for each of these 'departments' and includes assumptions on allocation of the costs between jurisdiction. Better documentation of the assumptions used is needed for each of these worksheets.

Transition Costs

The Transition Costs worksheet annualizes the anticipated capital expenditures that will be required to provide facilities and equipment at Devens for municipal functions. The current version assumes none of the existing facilities (e.g. the fire station) will be used, since no use agreement is in place. Annual costs are estimated based on a 20 year, 4.5% bonding program.

Revenue

The Revenue worksheet estimates local receipts, state aid and other revenues for each community, using a variety of assumptions. For example, Chapter 70 educational aid is estimated based on estimated school enrollments and housing units. This worksheet needs a clearer statement of the assumptions and methodologies used to fill each cell.

Ins. & Ben.

This worksheet apparently is used to calculate overhead costs for personnel, but does not connect with any other worksheet. These data are entered into the respective 'Pink Tab' worksheets

Regional Services (Water & Sewer)

This worksheet estimates water and sewer maintenance by town based on length of pipe. It is not used in any other worksheet and may be redundant based on the current assumption that water and sewer will be contracted to the regional authority on a user-fee basis.

Real Estate Tabs

There are several worksheets that list the individual properties and parcels in each community with their assessment information. These data are used elsewhere in the model to obtain the total assessed value which is used in other worksheets. Tabs include:

- Harvard Homes
- Harvard Homes II
- Harvard Companies
- Harvard Companies II
- Ayer Homes
- Ayer Homes II
- Ayer Companies
- Ayer Companies II
- Shirley Homes (empty)
- Shirley Companies (empty)

Zoning & Parcels

This worksheet lists the existing zoning classifications, parcels numbers and acreage. It apparently is not referred to by any other worksheet in the model. It also includes a bar graph of the respective zoning by acres.

Equipment List

Two worksheets, Mass Development Vehicles and Mass Development Equipment include a descriptive list of the equipment currently used by Mass Development to service Devens. The information is not used in the model.

DOR Lottery

This worksheet summarizes assessed values from the Real Estate sheets along with hard estimates of the number of school children. It appears not to be used for any calculation in the model.

DEC Budget

This spreadsheet lists the FY03 to FY06 budgets for the Devens Enterprise Commission. The information is not used by the model.



Accuracy

As part of this analysis, the financial model was reviewed in detail, looking for formula and logic errors. A few minor errors were found, including incorrect cell content references and double-counting of data. These are considered relatively minor and do not appear to impact the integrity of the overall model. The biggest constraint with the model is the numerous data input locations spread over several worksheets, which increases the likelihood of data input errors (particularly for occasional users of the model who are not familiar with the overall layout and design) thus reducing the accuracy of the model and potentially compromising the output.

Version 6 of the model is also incomplete, in that some additional information regarding departmental costs needs to be added. Not all inputs and assumptions are defined or detailed, although the worksheets have numerous comments from the different authors attached to individual cells, as a way of providing further explanation of the cell's content or the methodology used to obtain a particular value.

As stated previously, the financial model is 'static' in that it is a snapshot of the fiscal condition of the towns and Devens at a single point in time. The current set of estimates inherent in Version 6.0 includes the costs associated with operating Devens at full build-out, which may not occur for 20 years or more, and matches those costs and revenue up with current (or recent) actual costs and revenues. Although this is an acceptable fiscal impact methodology, it is limited in that it does not take into account interim scenarios where incremental costs may differ. To undertake a dynamic simulation would require multiple runs of the model with different assumptions (e.g. at 5 years, 10 years and 20 years), or the introduction of additional assumptions regarding the relationship of costs and revenues to growth over time.



Preliminary Results

Version 6 of the financial model, as developed by the committee and without any alterations by the Consultant, provides the following preliminary results:

- At full build-out, Devens would contain approximately 11.6 million square feet of commercial and industrial space and a total of 480 housing units (with most new units at Salerno and Daveo areas). Total estimated assessed tax value would be approximately \$1.5 billion, broken down as follows in Table 3-1:

Table 3-1

Assessed Values by Land Use Type (millions)

DDEB Financial Model – Version 6.0

Land Use	Scenario 1	Scenario 2
Industrial	\$174.3	\$174.3
Commercial	1,045.5	1,045.5
Residential	141.1	141.1
Personal Property ¹	161.8	110.1
Total Assessed Value	1,522.7	1,471.0

Table 3-2 compares the additional assessed values that would be created at Devens (under Scenario 1) with the existing tax base in each of the three host communities.

Table 3-2

Assessed Value by Community (millions) – Scenario 1

DDEB Financial Model – Version 6.0

Town	Existing Townwide Assessed Value	Additional Assessed Value from Devens	Percentage Change
Ayer	\$751.8	\$428.0	56%
Shirley	386.1	272.6	71%
Harvard	883.4	832.1	94%
Total	2,001.3	1,522.7	100%

- Including full transition costs (new municipal facilities and equipment), this would reduce tax rates in each of the three towns under Scenario 1 as follows:
 - Ayer: residential rate - \$6.68 from \$9.50
commercial rate - \$12.35 from \$21.12
 - Shirley: combined rate - \$8.60 from \$13.94
 - Harvard: combined rate - \$8.67 from \$11.45

- For Scenario 2 (Devens as new municipality) the combined tax rate would be \$3.89.

Preliminary indications, based on the assumptions in Version 6.0 of the model, are that Devens at full build-out can significantly impact the host communities by substantially increasing the tax base and reducing the tax burden of each. Further analysis and refinement of the model will provide additional details.

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Because of the method used to estimate personal property assessments relies on the calculated tax rates, the amount differs by town,



Comments and Recommendations on the Model

The following comments and/or recommendations are made to enhance the model's usefulness and to alleviate some of the issues identified in the Consultant's review:

1. Convene a formal sub-committee of no more than 4 or 5 members (all of whom are familiar with the model) to go through each worksheet and resolve issues and agree on assumptions and formatting.
2. Move all key data input (cells where 'hard' numbers are entered) to one or two introductory worksheets, including a full narrative explanation of the source of the data, where in the model it is utilized and the logic behind it. This has been partially accomplished on the Jurisdictions and Assumptions worksheet, but needs to be improved. In addition, develop a narrative description of the model with explicit instructions for how to modify it to run different scenarios (Model Handbook).
3. Move the commercial/industrial and residential price and assessment spreadsheet sections of the Summary worksheet to a new worksheet, in order to simplify the summary information by town and enhance the presentation of the results.
4. The estimation of municipal revenues for each community (Revenue tab) should be reviewed by the subcommittee to make sure that there is consensus regarding all assumptions. In particular, the estimates of State Aid (Chapter 70 and Chapter 90) need to be analyzed and impact on the model results determined. The use of a proxy may be necessary due to the uncertainty surrounding the methods used by the state to calculate these amounts.
5. The estimation of the personal property tax revenues is based on an analysis of statewide assessment data from FY03. The resulting assessed values (\$161 million under Scenario 1 and \$110 million under Scenario 2) works out to more than \$13 and \$9 per square foot of commercial/industrial property respectively. This estimation may not take into account the fact that many manufacturing companies in Massachusetts are exempt from personal property tax (an economic development incentive). This methodology will need be examined further.
6. Once the model is revised and the subcommittee agrees on the inputs, a series of alternative scenarios should be run to test the sensitivity of key assumptions. Those having a relatively large impact (for a given small change) on the model results (tax rates) should be further analyzed for any possible errors or inaccuracies.

As part of the on-going disposition planning services, further analysis and collaboration with the subcommittee is recommended during the final review and operational phase.

Local Aid

Local aid includes financial assistance that municipalities and regional school districts receive from the Commonwealth. Estimating the amount of local aid that may result from new development, redevelopment or a change in the composition of a community's tax base is among the most contested aspects of any fiscal impact study. As town officials know, the Commonwealth's aid formulas are hardly transparent. Chapter 70 (education) is a good example of complicated local aid formulas: contrary to popular understanding, school aid is not based on a straightforward amount per student. Moreover, the aid formulas do not determine how much aid a community will receive. Ultimately, all local aid funds require action by the General Court and approval by the governor. Thereafter, the formulas provide a legal method for allocating local aid funds to cities and towns.

Another problem with forecasting local aid is that state programs change from time to time, as evidenced by the recent elimination of school transportation assistance and the Highway Fund. Furthermore, the amount of aid received from some programs has nothing to do with population or tax base growth and these programs should not be included in a fiscal impact forecast. In addition, local aid receipts are offset by state charges. At times, Harvard, Ayer and Shirley have absorbed a rate of growth in state charges (assessments) that exceeded the rate of growth in total state aid, which means their net state aid was not quite as generous as gross receipts on the "Cherry Sheet" might imply.



Local Aid Programs

Chapter 70

Education funding is appropriated by the legislature and administered by the Department of Education (DOE) under G.L. c.70, the Education Reform Act, which changed the procedures for calculating state aid and established minimum spending requirements for Massachusetts cities and towns beginning in 1993. While the purpose of Education Reform is remarkably simple, the same cannot be said for its implementation. The law embraces three components: a foundation budget for each community, a local contribution affordable to the community, and a state contribution that fills the gap.

Chapter 70 charges DOE with responsibility for setting each year's foundation budgets. The foundation budget represents the minimum expenditures necessary to provide an "adequate" education for all school-age children. It consists of instructional, support and administrative salaries, instructional, other operating and maintenance expenses expressed on a per-pupil basis. To compute a community's foundation budget, DOE multiplies these per-pupil costs by a foundation enrollment estimate (usually the prior year's October 1 count of K-12 and other students). The foundation budget formula is statutory and except for modest changes made in the late 1990s, it has not changed significantly since the law was passed in 1993.

The Education Reform Act also mandates that municipalities fund as much of the foundation budget as possible given their ability to pay. A community's education spending requirement is known as the "minimum required contribution." In the past few years, the state's share – or Chapter 70 local aid – consisted of two amounts: base aid, or the amount paid by the state in the previous fiscal year, and "foundation aid," or the amount required to close the gap, if any, between base aid and the community's minimum required contribution. The sum of a community's minimum required contribution and Chapter 70 aid is known as "net school spending." For FY06, Chapter 70 local aid has changed again, this time as follows:

Chapter 70 aid = the foundation budget *minus* a community's minimum contribution, adjusted upward *if necessary* to equal FY05 Chapter 70 aid (a hold-harmless trigger), adjusted upward *if necessary* by an amount needed to guarantee a Chapter 70 increase of \$50 per student in FY06.

In general, the Chapter 70 aid formula tends to make high-growth communities and lower-income jurisdictions eligible for additional aid. The minimum contribution is determined by applying a revenue growth factor to the previous year's expenditures for schools. Municipal revenue growth factors are generated by the Department of Revenue (DOR). When revenue growth lags behind enrollment growth, Chapter 70 aid may not be adequate to assure that the net school spending requirement is met. Under these conditions, DOE has supplemented base aid with additional resources. In FY 2005, 128 local and regional school systems statewide received additional funds over their base Chapter 70 aid calculation. Harvard, Ayer and Shirley did not qualify for additional funds under the aid formula used in FY 2004-2005. In FY 2006, the Chapter 70 foundation aid calculations for Ayer and Harvard triggered "hold harmless" aid, i.e., amounts needed to maintain FY 2005 aid. All three host communities received a modest increase under the \$50 per-pupil provision of this year's aid formula.

Other Education Aid Programs

In FY 2004, the state terminated a long-standing source of aid for school transportation reimbursements to local school districts. The other education aid sources currently funded by the legislature include partial reimbursements for school construction projects approved by the former School Building Assistance Bureau (SBAB), payments for retired teacher pensions, operating and capital cost reimbursements for charter schools, grants to achieve racial equality, partial reimbursements for school lunch programs and tuition assistance under the "school choice" program. As of FY 2006, some of these programs have been relocated to the Cherry Sheet and constitute part of a community's local aid package.

The most significant change in education funding from the Commonwealth involves a moratorium on requests for school construction aid until July 2007. The Romney

Administration has transferred school construction assistance from DOE to the School Building Assistance Authority (SBAA), a new agency charged with managing the Commonwealth's school construction bond portfolio. The SBAA's project ranking criteria and assistance formulas have not been determined.

Municipal Assistance

Local aid programs have changed from time to time, but the sources of local aid receipts currently funded by the legislature include:

- Lottery, Beano & Charity Games
- Additional Assistance
- Local Share of Racing Taxes
- Aid to Local and Regional Public Libraries
- Police Career Incentive (Quinn Bill)
- Urban Renewal Programs
- Veterans' Benefits
- Reimbursement for Exemptions for Veterans, Blind and Surviving Spouses, and the Elderly
- Payments in Lieu of Taxes (PILOT) for State-Owned Land

Most of these programs are not directly affected by new development, but they may be affected by certain types of projects. For example, a single-family home development is unlikely to generate new requests for assistance to veterans, their survivors or the elderly, but an elderly housing development may trigger an increase in need for these services and corresponding growth in state reimbursements to the community. Of all general government aid sources, the Lottery is most sensitive to new development: its distributions are determined by a formula that includes population growth and equalized valuation per capita. Since the Lottery traditionally supplies most of the state's non-school aid to cities and towns, the amounts distributed each year are very important to local officials. To a lesser extent, Aid to Public Libraries is also affected by new development because one of its components (Municipal Equalization Grant) is based on a formula comparable to that of the Lottery. Aid to Public Libraries is administered by the state Board of Library Commissioners, which is required to certify that communities are in compliance with minimum spending thresholds set by law or otherwise eligible for waivers.

It is very difficult to calculate the impact of local population growth on Lottery aid because the formula considers *local population growth as a percentage of total population growth for the state as a whole*. Assuming the legislature continues to reduce diversions from the Lottery to the state budget, the host communities should begin to see growth in Lottery aid on the Cherry Sheet. Most if not all of this increased aid will be attributable a decrease in diversions and growth in Lottery revenue, not population growth in the host communities or at Devens.



Recommendations

The DDEB Financial Model makes a noble effort to capture local aid sources that contribute to a community's General Fund revenue each year. Since some aspects of the state's aid formulas require a comparison of local to state conditions, such as a community's estimated share of the state's population growth rate, equalized valuation per capita rank and median household income rank, modeling the impacts of land use change on a community's local aid cannot be done with the precision that people would like. However, it is possible to approximate the *results* of statutory formulas by using trended data to compute a community's average experience over time.

Chapter 70

For Chapter 70 aid, it has been found that the most reliable indicator of future aid is a proxy formula that works as follows:

New Chapter 70 aid = [estimated number of new students X Actual Net School Spending (NSS) per student] X percent Chapter 70 aid of Actual NSS.

To apply this formula, a five-year average of Chapter 70 aid as a percentage of Actual NSS is typically used. *Actual NSS* represents what a city or town has actually spent for public schools, i.e., the sum of DOE's minimum local contribution, Chapter 70 aid, and any additional amounts expended by the community above state requirements. One advantage to the recommended proxy is that it computes Chapter 70 aid as a share of total new school expenditures and is not directly based on estimated enrollment change. A second advantage is that by relying on an average of Chapter 70 aid over time, the proxy accommodates (to some extent) annual fluctuations in the amounts appropriated for education aid by the legislature.

Municipal Aid

For purposes of estimating non-school aid that may be generated for the host communities if Devens reverts to their jurisdiction, it is recommended that the Financial Model focus on sources that are directly affected by land use change:

- Lottery, Keano & Charity Games
- Additional Assistance
- Local Share of Racing Taxes
- Aid to Local and Regional Public Libraries
- Police Career Incentive
- Payments in Lieu of Taxes (PILOT) for State-Owned Land

The existing DDEB Model appears to estimate these sources in a reasonably appropriate way. The Model could incorporate an adjustment factor to reflect aid fluctuations over time, as this would simulate two conditions: changes in actual funds distributed by the state, and the relationship between each community's population and EQV growth to population and EQV growth statewide. However, these kinds of changes may not contribute enough value to justify the effort required to compute adjustment factors and insert them into the model worksheets.

The other sources of aid – such as veterans benefits – usually have little if anything to do with municipal growth. Devens as a separately incorporated town may experience new outlays for these services and would receive partial state reimbursement in accordance with the statutory formulas, like all other municipalities. In most communities across the state, however, expenditures for veterans benefits or tax exemptions for veterans and the blind are extremely small – and so are the associated reimbursements. Together, these two categories of local aid comprise .20% of the state's entire local aid spending each year.

If the DDEB concurs with these methodology recommendations, we would be pleased to provide estimates of Chapter 70 and non-education aid for the host communities and Devens as a separately incorporated town. This procedure should not be conducted without the DDEB's concurrence as to the projected number of new housing units (high/low forecast) described in the Housing Market Analysis. The number and types of dwelling units used to provide local aid estimates will have a significant impact on the results because not all homes will generate the same population or school enrollment growth.