MEMORANDUM

Date: June 3, 2021

To: Town of Montgomery Industrial Development Agency

From: Michelle L. Kennedy, Of Counsel, Whiteman Osterman & Hanna LLP

Re: Walden Construction Enterprise LLC Proposed IDA Project

This memorandum shall supplement our firm's letter dated June 2, 2021 and the application to the Town of Montgomery Industrial Development Agency of Walden Construction Enterprise LLC for financial assistance, including, without limitation, the expert report of Cynthia Falk, Ph.D. The application materials present the project as eligible for financial assistance as a retail project or a commercial project or both.

Retail projects under Section 862 of the NYS General Municipal Law must meet specific statutory requirements. Such criteria have been met with respect to the proposed senior housing project as provided in our letter of June 2, 2021 and the report of Cynthia Falk, Ph.D. This memorandum shall focus on the eligibility of the project for financial assistance as a commercial project eligible for financial assistance pursuant to Article 18-a of the NYS General Municipal Law.

The Town of Montgomery Uniform Tax Exemption Policy, Section 8(E), attached as EXHIBIT I, specifically recognizes senior housing projects as eligible for financial assistance. This section of the policy lists those projects that qualify for the 10-year PILOT schedule and reads in pertinent part with emphasis added for clarity, "Eligible Projects include, but are not limited to media and communications, healthcare, insurance, recreation, professional office, workforce housing, senior housing, healthcare/assisted living, hotels/lodging, qualifying retail, and tourism facilities." This policy evidences a finding by the Agency that senior housing projects, in general, qualify as commercial activity within the meaning of Article 18-a.

The Office of the State Comptroller has stated that "local officials must determine, based upon all the relevant facts, whether construction of an apartment complex will promote employment opportunities and prevent economic deterioration."[1] The Comptroller opinion specifically declines to "render an opinion as to whether a project which consists of the construction of an apartment complex is a commercial activity within the meaning of Article 18-A."[2] The Office on the State Comptroller stated further, "Such a determination must be made by local officials based upon all the facts relevant to the proposed project." The opinion notes that such determination should take into

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[1] Ops. St. Com., No. 85-51 (Aug. 16, 1985).
[2] *Id.*

account the stated purposes of the New York State Industrial Development Act specifically the promotion of employment opportunities and the prevention of economic deterioration.

Ryan, et al., v. Town of Hempstead Industrial Development Agency, Supreme Court, Nassau County upheld IDA assistance to a project involving the construction of a 336 unit apartment complex. The Court concluded that the residential project was a project within the meaning of General Municipal Law § 854(4), and in furtherance of the purpose of the industrial development agency to promote employment opportunities and prevent economic deterioration. The Court considered the following factors:

(a) The municipality needed attractive multi-family housing to retain workers and attract new business;

(b) The municipality needed a healthy residential environment to further economic growth;

(c) The municipality lacked affordable, safe, clean multi-family housing;

(d) The project would provide a nucleus of a healthy residential environment, and would be instrumental and vital in the further growth of the municipality;

(e) The acquisition and construction of the project would promote and maintain job opportunities, health, general prosperity and economic welfare of the citizens of the municipality and State;

(f) The acquisition and construction of the project would improve the local standard of living and thereby serve the public purposes of the Industrial Development Agency Act; and

(g) The project was consistent with the municipality's revitalization plan.

The Town of Montgomery Industrial Development Agency may consider similar factors in reaching a determination that the proposed senior housing project constitutes a commercial project eligible for IDA financial assistance. The expert report of Cynthia Falk, Ph.D., submitted with the IDA application, made the following findings consistent with the factors outlined above:

(a) *The municipality needs senior housing to retain population*;

Roughly one quarter of the population of the village is age 50 or above, but only eight percent are age 65 or above. American Community Survey data suggests that following retirement many people may leave the village. In the

Poughkeepsie-Newburgh-Middletown, NY Metro Area as a whole, more than 15 percent of the population is age 65 or older. [3]

(b) *The municipality needs a healthy residential environment to further economic growth by retaining population*;

The vacancy rate within the Village of Walden is one half of the vacancy rate in the State of New York as a whole, which is 12 percent. More importantly, the types of housing located within the Village of Walden are limited. The vast majority of housing units, 72 percent, are single units. As a result of the type of housing availability, the cost of housing is escalated and the opportunity for housing mobility is diminished.

(c) *The municipality lacks senior housing*;

The lower percent of those age 65 and older in the Village of Walden suggests a lack of appropriate amenities, including housing, for seniors living within the village.

(d) *The project would provide a nucleus of a healthy residential environment for seniors, and would be instrumental and vital in the further growth of the municipality*;

The availability of senior housing within Walden would create reasonable accessibility for those who would like to remain in the village but transition away from ownership of large single-family houses.

(e) *The acquisition and construction of the project would promote and maintain job opportunities, health, general prosperity and economic welfare of the citizens of the municipality and State*;

Construction costs are expected to be just shy of $12 million. The proposed purchase price for parcels 302-1-5.1 and 302-1-6 is $1,787,500, giving an overall estimated project cost for land acquisition and construction of $13,768,000. Annual costs of financing and expenses for furniture, office equipment, and gym equipment bring the project total to $14,788,000.

(f) *The acquisition and construction of the project would improve the local standard of living and thereby serve the public purposes of the Industrial Development Agency Act*; and

[3] U.S. Census Bureau (2019). American Community Survey 5-year estimates. Retrieved from Census Reporter Profile page for Walden, NY. http://censusreporter.org/profiles/16000US3677849-walden-ny/

In order to keep initial rents at the $1,700 rate, it is critical for the IDA to provide incentives through reduced taxes that will allow the project to move forward. Without tax exemptions the developers would not be able to make the rental units reasonably accessible to the residents of the Village of Walden, and without the project, Walden will continue to lack in senior housing.

(g) *The project is consistent with the municipality's comprehensive plan.*

The 2019 updates to the Village of Walden's Comprehensive Plan recognize the need for senior housing and other amenities geared toward people age 50 and above. Using 2016 American Communities Survey data, the plan argued: "Walden's population by age group is comparable to that of Orange County (see Table 3-3). Roughly 28% of the Village's population is 50 years of age or older. As this population ages, services to meet the needs of its senior population will grow" (page 9).[4] The decrease in the percent of people age 50 and older between 2016 and 2019 suggests that goal has not yet been met.

Further to the factors (a) through (g) above, the application to the IDA provides that one hundred seventy (170) construction jobs are expected to result directly from the project over the two-year construction period. Additionally, the project is expected to create four (4) permanent job positions and three (3) independent contractor positions at the project facility.

The National Association of Home Builders (NAHB) has developed an economic model to reflect the economic impact of construction, ongoing occupancy and derivatives from new housing construction. The model was piloted in 1996; however, the figures were updated in 2014. The NAHB model anticipates impacts on income and employment in sixteen local industries including construction, manufacturing, communications, transportation, utilities, wholesale and retail trade, finance and insurance, real estate, personal and repair services, business professional services, eating and drinking places, entertainment, automobile repair and service, and local government. In addition, the model anticipates added revenues from taxes and other types of local government fees (sales tax, property tax, income tax, utility fees). Most of the inputs are based on national averages.[5]

The NAHB model presents benefits realized in the first year of a housing construction project. The year 1 benefits to a market area from housing construction are created by (1) the direct and indirect impact of the construction activity and (2) the impact of local residents who earn money from the construction activity spending part of their earnings within the local area's economy.

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[4] https://villageofwalden.org/docs/2019_FINAL_DRAFT_COMP_PLAN.pdf.

[5] National Association of Home Builders, "The Economic Impact of Home Building in a Local Area Comparing Costs to Revenue for Local Governments" April 2015.

NAHB estimates that the year 1 impacts associated with building 100 rental apartments in a typical local area include:

- $11,700,000 in local income ($117,000 per unit)
- $2,200,000 in taxes and other revenue for local governments ($22,000 per unit)
- 161 local jobs (1.61 per unit)[6]

The NABH model also represents the ongoing local economic impacts created by residents of the rental apartments participating in the local economy with spending on goods and services and paying taxes. The model reports annually recurring impacts of building 100 rental units as follows:

- $2,600,000 in local income ($26,000 per unit)
- $503,000 in taxes and other revenue for local governments ($5,030 per unit)
- 44 local jobs (0.44 per unit)[7]

The 2015 NAHB report is attached as EXHIBIT II.

Using the NAHB model, the construction of the proposed 69 senior rental housing units, including the one caretaker's unit, would result in local economic benefits as follows in year 1:

- $8,073,000 in local income ($117,000 per unit)
- $1,518,000 in taxes and other revenue for local governments ($22,000 per unit)
- 111.09 local jobs (1.61 per unit)

Recurring, annual local economic impacts of building 69 senior rental units would be follows:

- $1,794,000 in local income ($26,000 per unit)
- $347,070 in taxes and other revenue for local governments ($5,030 per unit)
- 30.36 local jobs (0.44 per unit)

In consideration of the application to the IDA, the report of Cynthia Falk, Ph.D., the Agency's Uniform Tax Exemption Policy and the NAHB economic model and report, we respectfully submit that the proposed senior (age 55+) rental housing project qualifies as a commercial project eligible for IDA financial assistance.

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[6] Id. at page 2.
[7] Id. at page 3.

EXHIBIT I

TOWN OF MONTGOMERY UNIFORM TAX EXEMPTION POLICY

TOWN OF MONTGOMERY INDUSTRIAL DEVELOPMENT AGENCY

UNIFORM TAX EXEMPTION POLICY

SECTION 1. PURPOSE AND AUTHORITY. Pursuant to Section 874(4)(a) of Title One of Article 18-A of the General Municipal Law (the "Act"), Town of Montgomery Industrial Development Agency (the "Agency") is required to establish a uniform tax exemption policy ("Uniform Tax Exemption Policy") applicable to the provision of any financial assistance of more than one hundred thousand dollars to any project. This uniform tax-exemption policy was adopted pursuant to a resolution enacted by the members of the Agency on December 8, 2020.

SECTION 2. DEFINITIONS. All words and terms used herein and defined in the Act shall have the meanings assigned to them in the Act, unless otherwise defined herein or unless the context or use indicates another meaning or intent. The following words and terms used herein shall have the respective meanings set forth below, unless the context or use indicates another meaning or intent:

(A) "Administrative Fee" shall mean a charge imposed by the Agency to an Applicant or Project occupant for the administration of a Project.

(B) "Affected Tax Jurisdiction" shall mean, with respect to a particular Project, the Town and each Municipality or School District in which such Project is located which will fail to receive real property tax payments which would otherwise be due with respect to such Project due to a Tax Exemption obtained by reason of the involvement of the Agency in such Project.

(C) "Agency" shall mean the Town of Montgomery Industrial Development Agency.

(D) "Agency Fee" shall mean the normal charges imposed by the Agency to an Applicant or a Project occupant to compensate the Agency for the Agency's participation in a Project. The term "Agency Fee" shall include not only the Agency's normal application fee and the Agency's normal Administrative Fee, but also may include (1) reimbursement of the Agency's expenses, (2) rent imposed by the Agency for use of the property of the Agency, and (3) other similar charges imposed by the Agency.

(E) "Applicant" shall mean an applicant for financial assistance or a company or occupant of a Project which has been granted a Tax Exemption, as the case may be.

(F) "Applicant Project" shall mean a project which is undertaken by the Agency for the benefit of an Applicant which either (1) has been or will be financed by the issuance by the Agency of bonds, notes or other evidences of indebtedness with respect thereto or (2) is a straight lease transaction which the Agency has determined to undertake.

(G) "County" shall mean Orange County, New York.

(H) "Municipality" shall mean each village located within the Town.

(I) "Non-Applicant Project" means a project which is undertaken by the Agency for the benefit of the Agency and shall not include an Applicant Project.

(J) "Pilot" or "Payment in Lieu of Tax" shall mean any payment made to the Agency or an Affected Tax Jurisdiction equal to all or a portion of the real property taxes or other taxes which would have been levied by or on behalf of an Affected Tax Jurisdiction with respect to a project but for Tax Exemption obtained by reason of the involvement of the Agency in such project, but such term shall not include Agency Fees.

(K) "Project" shall mean an activity which is undertaken by the Agency for the benefit of an Applicant which either (1) has been or will be financed by the issuance by the Agency of bonds, notes or other evidence of indebtedness with respect thereto, or (2) is a straight lease transaction (as defined in the Act) which the Agency has determined to undertake.

(L) "Sales tax" or "sales taxes" shall mean sales and/or use taxes.

(M) "School District" shall mean each school district located within the Town.

(N) "Tax Exemption" shall mean any financial assistance granted to a Project which is based upon all or a portion of the taxes which would otherwise be levied and assessed against a Project but for the involvement of the Agency, including but not limited to sales and use exemption, mortgage recording tax exemption and exemption from real property taxes.

(O) "Town" shall mean the Town of Montgomery.

(P) "Adaptive Reuse" means the renovation and reuse of pre-existing structures for new purposes

(Q) "Workforce Housing" means housing that is affordable to households earning 60 to 120 percent of the area median income

(R) "New Construction" means entirely new structures or significant extensions to existing structures regardless of whether the site was previously occupied

SECTION 3. GENERAL PROVISIONS. (A) General Policy. The general policy of the Agency is to grant Tax Exemption as hereinafter set forth to any Project which has been or will be (1) financed by the issuance by the Agency of bonds, notes or other evidence of indebtedness with respect thereto, or (2) otherwise assisted by the Agency pursuant to a straight lease transaction .

(B) Application. No request for a Tax Exemption shall be considered for approval by the Agency unless an application and environmental assessment form are filed with the Agency on the forms prescribed by the Agency. Such application shall contain the information requested by the Agency, including a description of the proposed Project, the identification of the Applicant and the occupant of the Project, a description of each Tax Exemption sought with respect to the Project, the estimated value of each Tax Exemption sought with respect to the Project, the proposed financial assistance being sought with respect to the Project, the estimated date of completion of the Project, and whether such financial assistance is consistent with this Policy.

(C) Exceptions. The Agency reserves the right to deviate from such policy in special circumstances. In determining whether special circumstances exist to justify such a deviation, the Agency may consider the magnitude of the deviation sought and the factors which might make the project unusual, which factors might include but not be limited to the following factors: (1) the magnitude and/or importance of any permanent private sector job creation and/or retention related to the proposed project in question; (2) the impact of such project on existing and proposed businesses and/or economic development projects; (3) the amount of private sector investment generated or likely to be generated by such project; (4) demonstrated public support for such project; (5) the estimated value of the Tax Exemptions requested; and (6) the extent to which such project will provide needed services and/or revenues to the Affected Tax Jurisdictions. In addition, the Agency may consider the other factors outlined in the Act. The process for any deviation is set forth in this policy.

SECTION 4. PROJECT APPROVAL POLICY. (A) Prior to the adoption of a resolution approving the grant of financial assistance for an Applicant seeking financial assistance, the following shall be accomplished:

(1). Assessment — The Agency members shall assess all material information included in connection with the application for financial assistance submitted by or on behalf of the Applicant seeking such financial assistance in order to afford a reasonable basis for the decision by the Agency to provide financial assistance for a proposed project.

(2). Cost Benefit Analysis — The assessment material shall include a staff-prepared written cost-benefit analysis identifying:

- Extent to which a Project will create or retain permanent private-sector jobs.
- Estimated value of tax exemptions and support.
- Amount of private sector investment.
- Likelihood of timely Project completion.
- Extent of "new revenue" provided to local taxing jurisdictions.
- Other public benefits.

The members shall consider the cost-benefit analysis as part of the assessment.

(3). Applicant Confirmation of Compliance — The Agency must receive from the Applicant a written statement that, as of the date of the application, the proposed project is in substantial compliance with all provisions of General Municipal Law Article 18-A, including but not limited to Sections 859-a and 862(1).

(4). Notification — If a proposed project involves the removal or abandonment of a facility or plant within New York State, the Agency shall notify the chief executive officer or officers of the municipality or municipalities in which the facility or plant was located. If applicable, such notice shall be sent within 10 days following the adoption of a Public Hearing Resolution.

SECTION 5. SALES TAX EXEMPTION. (A) General. State law provides that purchases of tangible personal property by the Agency or by an agent of the Agency, and purchases of tangible personal property by a contractor for incorporation into or improving, maintaining, servicing or repairing real property of the Agency, are exempt from sales and use taxes imposed pursuant to Article 28 of the Tax Law. The Agency has a general policy of abating sales and use taxes applicable only to the initial acquisition, construction and/or equipping of an Applicant Project.

(B) Exemption. The Agency has no requirement for imposing a payment in lieu of tax arising from the exemption of an Applicant Project from sales and/or use taxes applicable to the initial acquisition, construction and/or equipping of such project, except (1) as described in subsection (F) below or (2) in the circumstance where (a) an Applicant Project is offered sales and use tax exemption on the condition that a certain event (such as the issuance of bonds by the Agency with respect to the project) occur by a certain date and (b) such event does not occur, in which case the Agency may require that the Applicant make payments in lieu of sales and use taxes equal to the amount of tax which otherwise may have been due to the New York State Department of Taxation and Finance.

(C) Period of Exemption. Except as set forth in subsection (A) above, the period of time for which a sales and use tax exemption shall be effective (the "Tax Exemption Period") shall be determined as follows:

(1) General. Unless otherwise determined by the Agency, the sales and use tax exemption for an Applicant Project shall be for the Tax Exemption Period commencing with the issuance by the Agency of bonds, notes or other evidences of indebtedness with respect to such project, or the execution and delivery by the Agency of a lease agreement relating to such project, and ending on the date of completion of the project. The Tax Exemption Period for a Non-Applicant Project shall extend for such period of time as the Agency shall determine.

(2) Early Commencement. The Tax Exemption Period for an Applicant Project may, at the discretion of the Agency, commence earlier than the date of issuance by the Agency of the Agency's bonds, notes or other evidences of indebtedness relating to the project, provided that (a) the Agency has complied with the requirements of Section 859-a of the Act, (b) the Agency thereafter adopts a resolution determining to commence such period earlier, (c) the Applicant agrees to the conditions of such resolution and supplies to the Agency the materials required to be supplied to the Agency thereunder, and (d) the Chairperson or Executive Director of the Agency acknowledges satisfaction of all conditions to the granting of such Tax Exemption set forth in such resolution.

(3) Normal Termination. The Tax Exemption Period for an Applicant Project will normally end upon the completion of such project. On construction projects, the Agency and the Applicant shall agree on the estimated date of completion of the project, and the sales and use tax exemption shall cease on the earlier of (a) the actual date of completion of the project or (b) the date which is six (6) months after the estimated date of completion of such project. On non-construction projects, the Agency and the Applicant shall agree on the estimated date of completion of the project, and the sales and use tax exemption shall cease on the earlier of (a) the actual date of completion of the project or (b) the date which is three (3) months after the estimated date of completion of the project. If the Agency and the Applicant shall fail to agree on a date for completion of the project, the Agency shall on notice to the Applicant make the determination on the basis of available evidence.

(4) Later Termination. The Agency, for good cause shown, may adopt a resolution extending the period for completion of the project and/or extending the Tax Exemption Period.

(D) Items Exempted. The sales and use tax exemption granted by the Agency with respect to an Applicant Project shall normally extend only to the following items acquired during the Tax Exemption Period described in subsection (B) above:

(1) improvements to and items incorporated into the real property.

(2) tangible personal property, including furniture, furnishings and equipment used to initially equip the project or otherwise forming part of the project, if purchased by the Applicant as agent of the Agency;

(3) the rental of tools and other items necessary for the construction and/or equipping of the project, if rented by the Applicant as agent of the Agency; and

(4) office supplies, fuel and similar items consumed in the process of acquiring, constructing and/or equipping the project, if purchased by the Applicant as agent of the Agency.

(E) Items Not Exempted. A sales and use tax exemption with respect to an Applicant Project shall not be granted by the Agency for the following:

(1) purchases occurring beyond the Tax Exemption Period described in subsection (B) above;

(2) repairs, replacements or renovations of the project, unless such repairs, replacements or renovations constitute major capital-type expenses approved by the Agency as a separate project in the manner contemplated by the Act; or

(3) operating expenses, unless such operating expenses constitute major capital-type expenses approved by the Agency as a separate project in the manner contemplated by the Act.

(F) Percentage of Exemption. Unless otherwise determined by resolution of the Agency, the sales and use tax exemption shall be equal to one hundred percent (100%) of the sales and/or use taxes that would have been levied if the project were not exempt by reason of the Agency's involvement in the project. If an exemption of less than one hundred percent (100%) is determined by the Agency to be applicable to a particular Applicant Project, then the Applicant shall be required to pay a Pilot to the Agency equal to the applicable percentage of sales and/or use tax liability not being abated. The Agency shall remit such Pilot, within thirty (30) days of receipt thereof by the Agency, to the Affected Tax Jurisdictions in accordance with Section 874(3) of the Act.

(G) Appointment of Agency Agent. The final act of granting a sales and/or use tax exemption by the Agency shall be confirmed by the execution by the appointment of the Project owner ("Owner") as Agency agent, with the authority to purchase Project-related property and services using the Agency's sales tax exemption. The Agency must file Form ST60 with the New York State Department of Tax and Finance within 30 days after the appointment. The Owner must notify the Agency of each sub-agent appointment, so the Agency can execute the required Form ST-60 for the sub-agent. Contractors and subcontractors who have not been appointed Agency agent or sub-agent cannot use the sales and tax exemption for equipment rentals, tools, supplies, and other items that do not become part of the finished Project. All Project contractors and subcontractors must be appointed as agent or sub-agent of the Agency in order to use the sales tax exemption for Project-related purchases. Owners and other properly appointed Agency agents and sub-agents claim the sales tax exemption for all purchases by giving their vendors Form ST-123. All bills, invoices and other documents for Project-related purchases by Agency agents and sub-agents should specifically indicate the purchase is made as agent of the Agency (i.e., name of purchaser is "ABC Company, as agent of the Town of Montgomery IDA"). . Such confirmation letter may either be in the form of a letter for the duration of the anticipated construction period relating to the project (where the sales and use tax exemption is permanent, because the Agency is satisfied that any conditions precedent to such sales and use tax exemption, such as the issuance of bonds or the execution of a lease agreement by the Agency, have been satisfied) or a letter having a shorter duration (where such sales and use tax exemption is tentative, because there remain conditions precedent to such sales and use tax exemption which have not been satisfied). Each such confirmation letter shall describe the scope and term of the sales and use tax exemption being granted.

(H) Required Filings. The New York State Department of Taxation and Finance requires that all Agency agents and sub-agents Owner must file Form ST-340 with the Department and the Agency on or before the last day of February each year. The ST-340 reports the amount of Agency sales tax exemptions claimed for the prior calendar year. The Owner's agreements with its contractors and subcontractors should require the contractors and subcontractors to provide to the Owner the annual information regarding the amount of sales tax exemptions claimed. The project documents shall require that (1) a copy of such ST-340 report will also be filed with the Agency and (2) that the project occupant shall maintain, for a period ending seven (7) years after the last purchase made under the sales and use tax exemption, and make available to the Agency at the request of the Agency, detailed records which shall show the method of calculating the sales and use tax exemption benefit granted by the Agency.

SECTION 6. MORTGAGE RECORDING TAX EXEMPTION. (A) General. State law provides that mortgages recorded by the Agency are exempt from mortgage recording taxes imposed pursuant to Article 11 of the Tax Law. The Agency has a general policy of abating mortgage recording taxes for Applicants under the following circumstances: (1) Initial financing obtained from the Agency with respect to each project with respect to which the Agency issues debt which will be secured by a mortgage upon real property; (2) In instances where the initial financing commitment provides for a construction financing of the Agency to be replaced by a permanent financing of the Agency immediately upon or shortly after the completion of the project, the Agency's general policy is to abate the mortgage recording tax on both the construction financing and the permanent financing; and (3) Refinancings of prior debt issued by the Agency, on any modifications, extensions and renewals thereof, so long as the Agency fees relating to same have been fully paid.

(B) Non-Agency Financings. With respect to straight lease or installment sale transactions where the Project occupant needs to borrow money for purposes relating the Project, and the lender will not make the loan to the Project occupant without obtaining a fee mortgage as security, the policy of the Agency is to consent to the granting of such mortgage and to join in such mortgage, so long as the following conditions are met:

(1) the documents relating to such proposed mortgage make it clear that the Agency is not liable on the debt, and that any liability of the Agency on the mortgage is limited to the Agency's interest in the project;

(2) the granting of the mortgage is permitted under any existing documents relating to the project, and any necessary consents relating thereto have been obtained by the project occupant; and

(3) the payment of the Agency Fee relating to the total Project cost.

(C) Exemption Affidavit. The act of granting a mortgage recording tax exemption by the Agency is confirmed by the execution by an authorized officer of the Agency of an exemption affidavit relating thereto.

(D) PILOT Payments. If the Agency is a party to a mortgage that is not granted a mortgage recording tax exemption by the Agency (a "non-exempt mortgage"), then the Applicant and/or Project occupant shall pay the same mortgage recording taxes with respect to such mortgage as would have been payable had the Agency not been a party to said mortgage (the "normal mortgage tax"). Such mortgage recording taxes are payable to the County Clerk, who shall in turn distribute same in accordance with law.

If for any reason a non-exempt mortgage is to be recorded and the Agency is aware that such non-exempt mortgage may for any reason be recorded without the payment of the normal mortgage tax, then the Agency shall prior to executing such non-exempt mortgage collect a PILOT equal to the normal mortgage tax and remit same within thirty (30) days of receipt by the Agency to the Affected Tax Jurisdictions in accordance with the Act.

SECTION 7. REAL ESTATE TRANSFER TAXES. (A) Real Estate Transfer Tax. Article 31 of the Tax Law provides for the imposition of a tax upon certain real estate transfers. Section 1405(b)(2) of the Tax Law provides that transfers into the Agency are exempt from such tax, and the New York State Department of Taxation and Finance has ruled that transfers of property by the Agency back to the same entity which transferred such property to the Agency are exempt from such tax. The general policy of the Agency is to impose no payment in lieu of tax upon any real estate transfers to or from the Agency.

(B) Real Property Transfer Gains Tax. Article 31-B of the Tax Law provides for the imposition of a tax upon gains derived from the transfer of certain real estate in New York State. Certain transfers are exempt from such tax. It is the policy of the Agency to comply with the law, and to file the appropriate documentation with the New York State Department of Taxation and Finance to obtain preclearance by that department for any documents transferring real property to or from the Agency.

(C) Required Filings. It shall be the responsibility of the Applicant and/or Project occupant to ensure that all documentation necessary relative to the real estate transfer tax and the real estate transfer gains tax are timely filed with the appropriate officials.

SECTION 8. REAL ESTATE TAX EXEMPTION. (A) General. Pursuant to Section 874 of the Act and Section 412-a of the Real Property Tax Law, property owned by or under the jurisdiction or supervision or control of the Agency is exempt from general real estate taxes (but not exempt from special assessments and special ad valorem levies). However, it is the general policy of the Agency that, notwithstanding the foregoing, every non-governmental Project will be required to enter into a payment in lieu of tax agreement (a "Pilot Agreement"), either separately or as part of the Project documents. Such Pilot Agreement shall require payment of Pilot payments in accordance with the provisions set forth below.

(B) Pilot Requirement. Unless the Applicant and/or Project occupant and the Agency shall have entered into a Pilot Agreement acceptable to the Agency, the Project documents shall provide that the Agency will not file a New York Board of Real Property Services Form RP-412-a (an "Exemption Form") with respect to the Project, and the Project documents shall provide that the Applicant and/or the Project occupant shall be required to make Pilot payments in such amounts as would result from taxes being levied on the Project by the Affected Tax Jurisdictions if the Project were not owned by or under the jurisdiction or supervision or control of the Agency. The Project documents shall provide that, if the Agency and the Applicant and/or Project occupant have entered into a Pilot Agreement, the terms of the Pilot Agreement shall control the amount of Pilot payments until the expiration or sooner termination of such Pilot Agreement.

(C) Required Filings. As indicated in subsection (B) above, pursuant to Section 874 of the Act and Section 412-a of the Real Property Tax Law, no real estate tax exemption with respect to a particular Project shall be effective until an Exemption Form is filed with the assessor of each Affected Tax Jurisdiction. Once an Exemption Form with respect to a particular Project is filed with a particular Affected Tax Jurisdiction, the real property tax exemption for such Project does not take effect until (1) a tax status date for such Affected Tax Jurisdiction occurs subsequent to such filing, (2) an assessment roll for such Taxing Jurisdiction is finalized subsequent to such tax status date, (3) such assessment roll becomes the basis for the preparation of a tax roll for such Affected Tax Jurisdiction, and (4) the tax year to which such tax roll relates commences.

(D) Pilot Agreement. Unless otherwise determined by resolution of the Agency, all Pilot Agreements shall satisfy the following general conditions:

(1) Determination of Full Assessment: With respect to a Project including new construction, the general policy of the Agency is to take title to (or a leasehold interest in) said Project, and to file an Exemption Form providing that the appropriate officer or officers of the respective Affected Tax Jurisdictions in which such Project is located (each, an "Assessor") will determine the interim assessments of such Project as construction progresses thereon (each, an "Interim New Assessment") and a final assessment thereof (the "Final New Assessment") when construction is completed. With respect to a Project including existing buildings, the general policy of the Agency is to either avoid taking title to (or a leasehold interest in) such existing buildings, or, if such is not possible, to include the existing assessment on such buildings (the "Existing Assessment", and collectively with the Interim New Assessment, the "Full Assessment", and collectively with the Final New Assessment, the "Final Full Assessment"). Once the Final Full Assessment is fixed, the Final Full Assessment shall be frozen and used as the basis of taxation of the Project for the initial period (the "Initial Period") applicable to the Project pursuant to paragraph (2) below. During the Initial Period, the Applicant shall pay real estate Pilot payments determined in each tax year as follows: (a) first, determine the assessment of the new construction portion of the Project for such tax year (the "Current New Assessment"), which assessment shall be a percentage of the Final New Assessment determined by subtracting the percentage of abatement applicable to such year (as determined pursuant to paragraph (2) below) from 100%; (b) next, determine the assessment of the Project for such tax year (the "Current Pilot Assessment") by adding the Current New Assessment to the Existing Assessment; and (c) finally, determine the Pilot payment payable to with respect to the Project to each Affected Tax Jurisdiction by multiplying the Current Pilot Assessment by the applicable tax rate of the such Affected Tax Jurisdiction. Once the Initial Period has ended, the Applicant will pay real estate Pilot payments determined in each tax year as follows: multiply the Final Full Assessment by the applicable tax rate of the such Affected Tax Jurisdiction.

(E) PILOT Categories: Unless otherwise approved by the Agency, the period of exemption will fall within two categories, fifteen (15), or ten years (10) depending on the nature of the Project. The Agency reserves the right to deviate from this structure as provided by the Act and this Uniform Tax Exemption Policy.

(1) Fifteen-Year Strategic Schedule

Eligible Projects that are considered strategic priorities include, but are not limited, to general manufacturing, industrial, life sciences, research and development, banking/financial services, defense and aerospace, data-processing, food and/or beverage processing, agribusiness, telecommunications, medical/diagnostic labs, and biotechnology. This schedule provides that (i) the initial period shall be fifteen (15) years, and (ii) the percentage of each tax year shall be set forth in the following table:

Tax Year	Percent of Exemption
1	95%
2	95%
3	95%
4	85%
5	80%
6	75%

7	65%
8	60%
9	55%
10	50%
11	40%
12	30%
13	20%
14	10%
15	5%
Year 16 and thereafter	0%

(2) <u>Technology and Advanced Manufacturing Schedule</u>

Technology Projects (including, but not limited to, artificial intelligence, augmented reality, virtual reality, 3D printing, software, nanotechnology, cyber security, semiconductors, information technology, robotics, cloud services, IoT software/hardware/connectivity, data storage, big data analytics, and software/ hardware) and advanced manufacturing projects (including, but not limited to, the "use of innovative technologies to create existing products and the creation of new products. Advanced manufacturing can also include production activities that depend on information, automation, computation, software, sensing, and networking.)This schedule provides that (i)the initial period shall be fifteen (15) years, and (ii) the percentage of each tax year shall be set forth in the following table:

Tax Year	Percent of Exemption
1	100%
2	100%
3	100%
4	100%
5	100%
6	90%
7	80%
8	70%
9	60%
10	50%
11	40%
12	30%
13	20%
14	10%
15	5%
Year 16 and thereafter	0%

(3) <u>Ten Year Schedule</u>

For Projects that qualify for the ten-year schedule, the initial period shall be ten (10) years, and (ii) the percentage of each tax year shall be set forth in the table below. Eligible Projects include, but are not limited to media and communications, healthcare, insurance, , recreation, professional office, workforce housing, senior housing, healthcare/assisted living, hotels/lodging, qualifying retail, and tourism facilities.

Tax Year	Percent of Exemption
1	100%
2	90%
3	80%
4	70%
5	60%
6	50%
7	40%
8	30%
9	20%
10	10%
Year 11 and thereafter	0%

(4) <u>Adaptive Reuse of Facilities</u>

Adaptive reuse projects are considered a strategic priority, and therefore will fall into a separate and distinct category. Adaptive reuse projects may include, but are not limited to buildings that are historic, abandoned, underutilized, or need significant environmental remediation.

The Agency will consider the following variables when examining a commercial adaptive reuse project:

- The age of the building
- Barriers to development
- History in the community
- Amount of time the building has been vacant and/or underutilized
- Support of taxing jurisdiction that the structure is located in
- Whether reuse of the building will involve environmental remediation costs
-

For qualified adaptive reuse projects, the following schedule provides that (i) the initial period shall be fifteen (15) years, and (ii) the percentage of each tax year shall be set forth in the following table:

Tax Year	Percent of Exemption
1	90%
2	90%
3	90%
4	75%
5	75%
6	75%
7	50%
8	50%
9	50%
10	40%
11	30%
12	20%
13	10%
14	10%
15	5%
Year 16 and thereafter	0%

(5) Qualified Commercial: New Construction

If the commercial project involves new construction, the initial period shall be ten years with the percentage of exemption set forth in the following table:

Tax Year	Percent of Exemption
1	100%
2	80%
3	70%
4	60%
5	50%
6	40%
7	30%
8	20%
9	10%
10	10%
Year 11 and thereafter	0%

(6) Warehousing/Distribution

For warehousing and distribution projects, the initial period shall be ten (10) years, and (ii) the percentage of each tax year shall be set forth in the table below

Year	Percent of Exemption
1	60%
2	60%
3	60%
4	50%
5	45%
6	40%
7	35%
8	30%
9	20%
10	10%
Year 11 and thereafter	0%

(7) Solar and Small Energy Projects

Solar, eligible wind and small energy projects will be eligible for a fifteen (15) year PILOT commensurate with New York State's RPTL 487 tax exemption, with fixed PILOT Payments determined by the Agency in its sole discretion. In determining the PILOT Agreement, the Agency, may consider the total amount of power generated, stored, or transmitted by such project and the assessed value of such project.

(F) Reduction for Failure to Achieve Goals: If the Agency's approval of a particular project is predicated upon achievement by the project of certain minimum goals (such as creating and maintaining certain minimum employment levels), the Pilot Agreement may provide for the benefits provided thereby to the project to be reduced or eliminated if, in the sole judgment of the Agency, the project has failed to fulfill such minimum goals. Except as otherwise provided by resolution of the Agency, all real estate Pilot payments are to be paid to the Receiver of Taxes for the Town for distribution to the Affected Tax Jurisdictions. Upon expiration of the Initial Period as aforesaid, the assessment of the project shall revert to a normal assessment (i.e., the project will be assessed as if the project were owned by the Applicant and not by the Agency). Also, any addition to the project shall be assessed normally as aforesaid, unless such addition shall be approved by the Agency as a separate project following notice and a public hearing as described in Section 859-a of the Act. Other than fixing the Final Assessment for the Initial Period as aforesaid, the general policy of the Agency is to not provide the Applicant and/or project occupant with any abatement, other than abatements allowed under the Real Property Tax Law.

(G) Special District Taxes. As indicated above, the Agency cannot include in any exemption any special assessments and special ad valorem levies, and accordingly these amounts are not subject to abatement by reason of ownership of the Project by the Agency. The Pilot Agreement shall make this clear and shall require that all such amounts be directly paid by the Applicant and/or project occupant. However, Applicants and project occupants should be aware that the courts have ruled that an Agency-sponsored project is also eligible to apply for an exemption from special district taxes pursuant to Section 485-b of the Real Property Tax Law. If an Applicant or project occupant desires to obtain an exemption from special district taxes pursuant to said Section 485-b, it is the responsibility of the Applicant and/or project occupant to apply for same at its sole cost and expense.

(H) Payee. Unless otherwise determined by resolution of the Agency, all Pilot payments payable to an Affected Tax Jurisdiction shall be assessed, billed and collected by the Receiver of Taxes for the Town. Pursuant to Section 874(3) of the Act, such Pilot payments shall be remitted to each Affected Tax Jurisdiction within thirty (30) days of receipt.

(I) Enforcement. An Affected Tax Jurisdiction which has not received a Pilot payment due to it under a Pilot Agreement may exercise its remedies under Section 874(6) of the Act. In addition, such Affected Tax Jurisdiction may petition the Agency to exercise whatever remedies that the Agency may have under the project documents to enforce payment and, if such Affected Tax Jurisdiction indemnifies the Agency and agrees to pay the Agency's costs incurred in connection therewith, the Agency may take action to enforce the Pilot Agreement.

(J) Real Property Appraisals. Since the policy of the Agency stated in subsection (C)(1) is to base the value of a project for payment in lieu of tax purposes on a valuation of such project performed by the respective Assessors, normally a separate real property appraisal is not required. However, the Agency may require the submission of a real property appraisal if (1) the Assessor of any particular Affected Tax Jurisdiction requires one or (2) if the valuation of the project for payment in lieu of tax purposes is based on a value determined by the Applicant or by someone acting on behalf of the Applicant, rather than by an Assessor of an Affected Tax Jurisdiction or by the Agency. In lieu of an appraisal, the Agency may require that an Applicant submit to the Agency and each Assessor a certified enumeration of all project costs. If the Agency requires the submission of a real property appraisal, such appraisal shall be prepared by an independent MAI certified appraiser acceptable to the Agency.

SECTION 9. PROCEDURES FOR DEVIATION. (A) General. In the case where the Agency may determine to deviate from the provisions of this Uniform Tax Exemption Policy pursuant to the provisions of Section 3(C) hereof, the Agency may deviate from the provisions hereof, provided that:

(1) the Agency adopts a resolution (a) setting forth, with respect to the proposed deviation, the amount of the proposed Tax Exemption, the amount and nature of the proposed Pilot, the duration of the proposed Tax Exemption and of the proposed Pilot and whether or not a Tax Exemption of any kind shall be granted, (b) indicating the reasons for the proposed deviation and (c) imposing such terms and conditions thereon as the Agency shall deem just and proper; and

(2) as provided in Section 3(C) hereof, the Agency shall give prior written notice of the proposed deviation from this Uniform Tax Exemption Policy to each Affected Tax Jurisdiction, setting forth therein a general description of the proposed deviation and the reasons therefor.

Whenever possible, the Agency shall give such notice to each Affected Tax Jurisdiction at least thirty (30) days prior to the consideration by the Agency of the final resolution determining to proceed with such proposed deviation from this Uniform Tax Exemption Policy.

(B) Agency-Owned Projects. Where a project (1) constitutes a Non-Applicant Project, (2) is otherwise owned and operated by the Agency or (3) has been acquired by the Agency for its own account after a failure of a project occupant, such project may at the option of the Agency be exempted by the Agency from all taxes, to the extent provided in Section 874(1) and (2) of the Act.

(C) Unusual Projects. Where a project is unusual in nature and requires special considerations related to its successful operations as demonstrated by appropriate evidence presented to the Agency, the Agency may consider the granting of a deviation from the established exemption policy in accordance with the procedures provided in Section 3(B) and Section 8(A) hereof. The Agency may authorize a minimum payment in lieu of tax or such other arrangement as may be appropriate.

SECTION 10. ANNUAL ASSESSMENT POLICY. (A) The Agency shall annually assess the progress of each Project for which bonds or notes remain outstanding, or straight-lease transactions have not terminated, or which continue to receive financial assistance, or are otherwise active toward its achievement of the investment, job retention or creation, or other objectives of the active Project indicated in the active Project's application for financial assistance, or otherwise considered by the Agency in its approval of the active Project.

(1). Field Reports — To perform its assessments, the Agency shall at least annually solicit information from each active Project's representatives regarding investment, job retention or creation or other objectives of each active Project and such additional information as the Agency may find helpful in its assessment or which is required for the Agency to meet its reporting requirements under the Act. The Annual Project Information shall consist of information for the period of January 1 through December 31, except that the period for the first year of an active Project shall be the date of closing through December 31.

(2). Remediation — As part of its collection of annual Project information, staff may perform random or annual site visits of active Projects. Staff shall review the annual Project information of each active Project for completeness and, if necessary, communicate with an active Project's representatives to obtain any necessary information not initially provided. If the annual Project information demonstrates that an active Project has not met its goals, Agency staff shall meet with active Project's representatives to assess Project performance and its ability to fulfill the original Project goals (a "Project Evaluation Meeting").

(3). Project Assessment Reporting — Using the annual Project information and the findings from the Project Evaluation Meeting, if any, a written assessment shall be completed for each active Project by staff. An assessment for each active Project shall be provided annually to each member of the Agency. Each such assessment shall be completed no later than March 31 in order for the Agency to comply with its annual reporting requirements under the Act and the New York State Public Authorities Law.

SECTION 11. SUSPENSION, DISCONTINUATION, RECAPTURE OR TERMINATION OF BENEFITS POLICY. (A) The Agency has adopted this Suspension, Discontinuation or Recapture of Benefits Policy (the "Policy") in accordance with the Act and any other applicable law.

(B). Mandatory Recapture of the New York State Portion of Sales Tax — The Agency shall recapture from Applicants New York State sales tax benefits, in accordance with the provisions of the General Municipal Law, from Projects that utilized State sales tax exemptions:

- To which the Project was not entitled;
- In excess of the amounts authorized by the Agency;
- For property or services not authorized by the Agency; and/or
- For a Project that has failed to comply with a material term or condition to use the property or services in the manner required by any of the Project documents between the Applicant and the Agency.

Each of the foregoing four events are hereinafter referred to as a "State-Mandated Recapture Event". The Agency shall evaluate, annually as of December 31, or at any time information is brought to the Agency's attention, whether a State-Mandated Recapture Event has occurred.

(C). The approving resolution(s) and Project documents granting financial assistance in the form of State sales tax exemption benefits shall include the terms and conditions of the foregoing mandatory recapture provision. Within thirty (30) days of the recapture, the recapture amount shall be remitted to the New York State Department of Taxation and Finance. Such remittances shall include any penalties and interest imposed by the Agency. The failure to pay over such amounts to the Agency shall be grounds for the New York State Tax Commissioner to assess and determine State sales taxes due from the Applicant under article twenty-eight of the New York State Tax Law, together with any relevant penalties and interest due on such amounts.

(D). In order to effectuate the recapture of New York State sales tax benefits the Agency shall:

- Keep records of the New York State and local sales tax exemptions provided to each Project, with such records available to the New York State Tax Commissioner upon request.
- Report within thirty days of providing any financial assistance in the form of a sales tax exemption, the Project, the estimated amount of the exemption and other information as may be required by the New York State Tax Commissioner (Form ST-60).
- The Agency shall file an annual report with the New York State Tax Commissioner detailing its terms and conditions and its activities in recapturing any unauthorized New York State sales tax exemptions.

SECTION 12. SUSPENSION, DISCONTINUATION, RECAPTURE OR TERMINATION OF OTHER FORMS OF FINANCIAL ASSISTANCE. (A) With respect to all financial assistance other than the State portion of sales tax exemptions, the Agency shall have the right to suspend, discontinue, recapture, or terminate some or all of the financial assistance if:

- The Project utilized local sales tax exemptions for which it was not entitled, such exemptions were in excess of the amounts authorized by the Agency, and/or such exemptions were for property or services not authorized by the Agency (each, a "Local Sales Tax Benefit Violation");
- The Applicant, upon completion of the Project, fails to reach and maintain at least 85 percent of Its employment requirements for job creation and/or retention ("Job Deficit");
- The total investment actually made with respect to the Project at the Project's completion date is less than 85 percent of its investment requirement ("Investment Deficit");
- The Applicant fails to provide annually to the Agency certain information to confirm that the Project is achieving the investment, job retention, job creation, and other objectives of the Project ("Reporting Failure"); or

- There otherwise occurs any event of default under any Project document (each, an "Event of Default") or a material violation of the terms and conditions of any Project document (a "Material Violation").

(B). The Agency shall evaluate, annually as of December 31, or at any time information is brought to the Agency's attention, whether a Local Sales Tax Benefit Violation, Job Deficit, Investment Deficit, Reporting Failure, Event of Default, or Material Violation (each a "Noncompliance Event") has occurred. Notwithstanding the foregoing, the Agency may determine whether an Event of Default has occurred pursuant to any Project document in accordance with the terms of the Project document.

(C). At the time of any Noncompliance Event, the Agency shall determine by resolution whether to exercise its right to suspend, discontinue, recapture, or terminate all or any portion of the financial assistance provided to a Project, and shall consider the following in making its determination:

- Whether the Applicant has proceeded in good faith;
- Whether the Project has not performed as required due to economic issues, changes in market conditions, or adverse events beyond the control of the Applicant;
- Whether the enforcement by the Agency of its right to suspend, discontinue, recapture, or terminate all or any portion of financial assistance would create a more adverse situation for the Applicant, such as the Applicant going out of business or declaring bankruptcy, which would not occur if the Agency's rights were not exercised;
- Whether the enforcement by the Agency of its right to suspend, discontinue, recapture, or terminate all or any portion of financial assistance would create an adverse situation for the residents of Orange County; or
- Such other criteria as the Agency shall determine is a relevant factor in connection with any decision regarding the exercise of its right to suspend, discontinue, recapture, or terminate all or any portion of financial assistance.

(D). The Agency shall document its evaluation of the above criteria and based upon its evaluation, the Agency shall determine, at its sole discretion, whether to suspend, discontinue, recapture, or terminate all or any portion of the financial assistance. The determination shall provide terms, if any, by which a Applicant may remedy any Noncompliance Event upon which the determination was based. The Applicant must submit written documentation to the Agency covering compliance with all terms and conditions of the determination in order for the Agency to consider whether to resume financial assistance to the Applicant (which will be at the Agency's sole discretion).

(E). The Project agreement entered into between the Agency and the Applicant (the "Project Agreement") shall include the terms and conditions of the foregoing provisions. The Agency shall also include in the Project Agreement a requirement that the Applicant comply with the Agency's right to suspend, discontinue, recapture, or terminate financial assistance and that the Applicant shall repay all or a portion of the financial assistance granted by the Agency to the Applicant pursuant to any Determination.

(F). Any such amount constituting recovered or recouped tax exemptions shall be distributed to the appropriate affected tax jurisdictions, unless agreed to otherwise by any local taxing jurisdiction.

(G). Except as otherwise provided by the General Municipal Law, the recapture period will be the longer of: (1) the term of the Lease Agreement; or (2) five years following the Project's completion date. A Project will remain "active" for purposes of Section 874(12) of General Municipal Law and the Agency's Annual Assessment Policy during the term of the Project Agreement.

SECTION 13. ANNUAL REVIEW OF POLICY. At least annually, in accordance with the Act, the Agency shall review this Uniform Tax Exemption Policy to determine relevance, compliance with law, effectiveness, and shall adopt any modifications or changes that it shall deem appropriate. The Executive Director shall be responsible for conducting an annual review of this tax exemption policy and for an evaluation of the internal control structure established to ensure compliance with the tax exemption policy, which review shall be submitted to the Agency for consideration by the Agency.

DATED: MONTGOMERY, NEW YORK
December 8, 2020

EXHIBIT II

National Association of Home Builders, “The Economic Impact of Home Building in a Local Area - Comparing Costs to Revenue for Local Governments” April 2015

National Association of Home Builders

The Economic Impact of Home Building in a Typical Local Area

Income, Jobs, and Taxes Generated

April 2015

Housing Policy Department

NAHB®

The Economic Impact of Home Building in a Typical Local Area

Income, Jobs, and Taxes Generated

Contents

Executive Summary

Home building generates substantial local economic activity, including new income and jobs for residents, and additional revenue for local governments. The National Association of Home Builders has developed a model to estimate these economic benefits. The model captures the effect of the construction activity itself, the ripple impact that occurs when income earned from construction activity is spent and recycles in the local economy, and the ongoing impact that results from new homes becoming occupied by residents who pay taxes and buy locally produced goods and services. In order to fully appreciate the positive impact residential construction has on a community, it is important to include the ripple effects and the ongoing benefits. Since the model was initially developed in 1996, NAHB has used it successfully to estimate the impacts of construction in over 800 projects, local jurisdictions, metropolitan areas, non-metropolitan counties, and states across the country.

This report presents separate estimates of the local area impacts of building 100 single-family homes, 100 rental apartments and $1 million worth of spending on residential remodeling. As described more fully below, most of the key inputs (such as value of the homes being built, and impact fees and property taxes per dollar of new construction) are based on national averages. Other than construction-related fees and residential property taxes, local government revenue is determined by on aggregating line items for all 89,000-plus local governments in the U.S. in the latest Census of Governments.

For purposes of the NAHB model, a local area must be large enough to include the places where construction workers live and spend their money, as well as the places where the new home occupants are likely to work, shop, and go for recreation. In practice, this usually means a Metropolitan Statistical Area (MSA) or Metropolitan Division, as defined by the U.S. Office of Management and Budget (OMB) based on local commuting patterns. Outside of an MSA, many counties are relatively self-contained areas that will satisfy the above criteria for a local area.

The NAHB model produces impacts on income and employment in 16 industries and local government, as well as detailed information about taxes and other types of local government revenue. Aggregate results are summarized below. Subsequent sections of the report show detail by industry and type of tax or fee revenue generated.

Single-Family Construction

- The estimated one-year impacts of building 100 single-family homes in a typical local area include
    - **$28.7 million** in local income,
    - **$3.6 million** in taxes and other revenue for local governments, and
    - **394** local jobs.

  These are local impacts, representing income and jobs for residents of an average metropolitan area or nonmetropolitan county, and other sources of revenue, including permit fees) for all local jurisdictions within the local area. They are also one-year impacts that include both the direct and indirect impact of the construction activity itself, and the impact of local residents who earn money from the construction activity spending part of it within the local area. Local jobs are measured in full time equivalents—i.e., one reported job represents enough work to keep one worker employed full-time for a year, based on average hours worked per week by full-time employees in the industry. The one-year estimates also assume that construction materials are subject to a local sales tax of 1.52 percent, an average (weighted by population) computed by NAHB across rates for individual states reported by the Tax Foundation.

- The additional, annually recurring impacts of building 100 single-family homes in a typical local area include
  - **$4.1 million** in local income,
  - **$1.0 million** in taxes and other revenue for local governments, and
  - **69** local jobs.

  These are ongoing, annual local impacts that result from the new homes becoming occupied, and the occupants paying taxes and otherwise participating in the local economy year after year. The ongoing impacts also include the effect of increased property taxes, based on the difference between the value of raw land and the value of a completed housing unit on a finished lot, assuming that raw land would be taxed at the same rate as the completed housing unit.

The above impacts were calculated assuming that new single-family homes built in a typical metropolitan area or nonmetropolitan county have an average price of $378,000; which includes $48,000 in raw land value and $13,672 in permit, hook-up, impact and other fees paid to local governments; and incur an average property tax of $4,239 per year. The house price and raw land value are based on a blended average of prices of new homes built for sale and contract prices for custom homes built on the homeowner's land, from the Census Bureau's Survey of Construction (along with assumptions about raw land and other factors the Census Bureau uses when processing construction value in the survey).[1] The impact fees are based on a national average percentage estimated by NAHB in a 2011 article.[2] The property tax payment is based on a national average computed from the Census Bureau's American Community Survey summary files.

Multifamily Construction

- The estimated one-year impacts of building 100 rental apartments in a typical local area include
  - **$11.7 million** in local income,
  - **$2.2 million** in taxes and other revenue for local governments, and
  - **161** local jobs.

  These are local impacts, representing income and jobs for residents of the typical metropolitan area or nonmetropolitan county, and revenue for all jurisdictions within the local area. They are also one-year impacts that include both the direct and indirect impact of the construction activity itself, and the impact of local residents who earn money from the construction activity spending part of it within the local area's economy.

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[1] For more detail, see "Impact of Home Building and Remodeling on the U.S. Economy" published by NAHB in *HousingEconomics.com*, May 2014.

[2] "How Government Regulation Affects the Price of a New Home," *HousingEconomics.com*, July 2011

- The additional, annually recurring impacts of building 100 rental apartments in a typical local area include
    - **$2.6** million in local income,
    - **$503,000** in taxes and other revenue for local governments, and
    - **44** local jobs.

  These are ongoing, annual local impacts that result from the new apartments becoming occupied, and the occupants paying taxes and otherwise participating in the local economy year after year. They also represent impacts that have been reduced to account for the natural vacancy rate that tends to prevail in multifamily properties (see page 23 of the Technical Documentation).

These impacts were calculated assuming that new multifamily units built in the typical local area have an average market value of $145,000; which includes $14,000 in raw land value and $13,672 in permit, hook-up, impact and other fees paid to local governments; and incur an average annual property tax of $1,626 per unit. Value is based on national median asking rent for new apartments in the Survey of Market Absorption (funded by HUD and conducted by the U.S. Census Bureau) and the national median rent to value ratio in the inaugural Rental Housing Rental Housing Finance Survey (also funded by HUD and conducted by the Census Bureau). The assumptions about the construction related fee percentage and residential property tax rate are the same as for single-family construction.

Residential Remodeling

- The estimated one-year local impacts of $1 million spent on residential remodeling in a typical local area include
    - **$841,000** in local income,
    - **$71,000** in taxes and other revenue for local governments, and
    - **11 and a half** local jobs.

  Again, these represent local, one-year impacts occurring within a metropolitan area or nonmetropolitan county.

- Although certain remodeling jobs may be extensive enough to render otherwise uninhabitable units fit for occupancy (thereby allowing the local area to retain extra households and trigger ongoing impacts analogous to the ones for new construction), the NAHB local impact model uses a conservative default assumption that this is not the case. The ongoing, annual economic benefits to the local economy are therefore limited to
    - $11,000 in residential property taxes.

In addition to the treatment of property taxes, the estimated remodeling impacts assume that 1.25 percent of the value of the remodeling job is paid to a jurisdiction in the local area in the form of permit fees, a percentage NAHB Remodelers have reported as typical for projects undertaken by professional remodeling companies.

The Economic Impact of Home Building in a Typical Local Area

Income, Jobs, and Taxes Generated

Detailed Tables on Single-Family Construction

Impact of Building 100 Single-Family Homes In a Typical Local Area

Summary

Total One-Year Impact: Sum of Phase I and Phase II:

Local Income	Local Business Owners' Income	Local Wages and Salaries	Local Taxes[1]	Local Jobs Supported
$28,670,800	$8,606,200	$20,064,700	$3,358,600	394

Phase I: Direct and Indirect Impact of Construction Activity:

Local Income	Business Owners' Income	Local Wages and Salaries	Local Taxes[3]	Local Jobs Supported
$19,204,100	$6,526,800	$12,677,400	$2,152,500	237

Phase II: Induced (Ripple) Effect of Spending the Income and Taxes from Phase I:

Local Income	Business Owners' Income	Local Wages and Salaries	Local Taxes[1]	Local Jobs Supported
$9,466,700	$2,079,400	$7,387,300	$1,206,100	157

Phase III: Ongoing, Annual Effect that Occurs When New Homes are Occupied:

Local Income	Local Business Owners' Income	Local Wages and Salaries	Local Taxes[1]	Local Jobs Supported
$4,091,900	$922,400	$3,169,900	$1,014,800	69

[3] The term local taxes is used as a shorthand for local government revenue from all sources: taxes, fees, fines, revenue from government-owned enterprises, etc.

Impact of Building 100 Single-Family Homes in a Typical Local Area
Phase I—Direct and Indirect Impact of Construction Activity

A. Local Income and Jobs by Industry

Industry	Local Income	Local Business Owners' Income	Local Wages and Salaries	Wages & Salaries per Full-time Job	Number of Local Jobs Supported
Construction	$14,804,600	$5,048,300	$9,756,300	$55,000	176
Manufacturing	$1,500	$100	$1,500	$54,000	0
Transportation	$800	$400	$400	$29,000	0
Communications	$123,700	$43,200	$80,500	$78,000	1
Utilities	$27,300	$5,900	$21,400	$97,000	0
Wholesale and Retail Trade	$1,535,500	$338,600	$1,196,900	$35,000	34
Finance and Insurance	$276,900	$10,400	$266,500	$120,000	2
Real Estate	$760,400	$654,700	$105,600	$55,000	2
Personal & Repair Services	$76,000	$18,100	$57,900	$40,000	1
Services to Dwellings / Buildings	$52,100	$20,100	$32,000	$37,000	1
Business & Professional Services	$1,217,500	$283,300	$934,300	$66,000	14
Eating and Drinking Places	$43,800	$7,200	$36,600	$29,000	1
Automobile Repair & Service	$16,200	$4,900	$11,300	$40,000	0
Entertainment Services	$9,500	$900	$8,600	$33,000	0
Health, Educ. & Social Services	$1,700	$100	$1,700	$51,000	0
Local Government	$63,700	$0	$63,700	$74,000	1
Other	$192,900	$90,600	$102,200	$48,000	2
Total	$19,204,100	$6,526,800	$12,677,400	$53,000	237

B. Local Government General Revenue by Type

TAXES:		USER FEES & CHARGES:	
Business Property Taxes	$55,200	Residential Permit / Impact Fees	$1,367,200
Residential Property Taxes	$0	Utilities & Other Govt. Enterprises	$200,000
General Sales Taxes	$190,500	Hospital Charges	$92,600
Specific Excise Taxes	$8,200	Transportation Charges	$36,300
Income Taxes	$40,200	Education Charges	$37,700
License Taxes	$6,900	Other Fees and Charges	$113,200
Other Taxes	$4,600	TOTAL FEES & CHARGES	$1,847,000
TOTAL TAXES	$305,500	TOTAL GENERAL REVENUE	$2,152,500

Impact of Building 100 Single-Family Homes in a Typical Local Area
Phase II—Induced Effect of Spending Income and Tax Revenue from Phase I

A. Local Income and Jobs by Industry

Industry	Local Income	Local Business Owners' Income	Local Wages and Salaries	Wages & Salaries per Full-time Job	Number of Local Jobs Supported
Construction	$554,600	$203,900	$350,600	$55,000	6
Manufacturing	$1,900	$100	$1,800	$52,000	0
Transportation	$21,300	$10,300	$11,000	$29,000	0
Communications	$498,300	$206,300	$292,000	$81,000	4
Utilities	$171,900	$36,400	$135,600	$97,000	1
Wholesale and Retail Trade	$1,343,000	$226,000	$1,116,900	$31,000	36
Finance and Insurance	$289,100	$11,400	$277,800	$90,000	3
Real Estate	$919,000	$380,900	$538,100	$55,000	10
Personal & Repair Services	$342,200	$124,800	$217,400	$40,000	5
Services to Dwellings / Buildings	$121,900	$47,000	$74,800	$37,000	2
Business & Professional Services	$1,241,500	$359,300	$882,300	$58,000	15
Eating and Drinking Places	$615,900	$120,400	$495,600	$27,000	18
Automobile Repair & Service	$272,500	$82,000	$190,500	$40,000	5
Entertainment Services	$74,800	$14,200	$60,500	$30,000	2
Health, Educ. & Social Services	$1,467,600	$163,200	$1,304,400	$55,000	24
Local Government	$1,341,600	$0	$1,341,600	$60,000	22
Other	$189,600	$93,200	$96,400	$43,000	2
Total	$9,466,700	$2,079,400	$7,387,300	$47,000	157

B. Local Government General Revenue by Type

TAXES:		USER FEES & CHARGES:	
Business Property Taxes	$299,400	Residential Permit / Impact Fees	$0
Residential Property Taxes	$0	Utilities & Other Govt. Enterprises	$421,800
General Sales Taxes	$105,600	Hospital Charges	$89,300
Specific Excise Taxes	$44,400	Transportation Charges	$17,900
Income Taxes	$31,900	Education Charges	$18,600
License Taxes	$28,500	Other Fees and Charges	$125,900
Other Taxes	$22,900	TOTAL FEES & CHARGES	$673,400
TOTAL TAXES	$532,700	TOTAL GENERAL REVENUE	$1,206,100

Impact of Building 100 Single-Family Homes in a Typical Local Area
Phase III—Ongoing, Annual Effect That Occurs Because Units Are Occupied

A. Local Income and Jobs by Industry

Industry	Local Income	Local Business Owners' Income	Local Wages and Salaries	Wages & Salaries per Full-time Job	Number of Local Jobs Supported
Construction	$232,500	$85,600	$147,000	$55,000	3
Manufacturing	$800	$0	$800	$53,000	0
Transportation	$6,500	$3,200	$3,400	$29,000	0
Communications	$230,800	$96,100	$134,800	$81,000	2
Utilities	$81,800	$17,300	$64,500	$97,000	1
Wholesale and Retail Trade	$639,700	$104,500	$535,200	$31,000	17
Finance and Insurance	$151,400	$5,600	$145,900	$88,000	2
Real Estate	$283,900	$117,700	$166,300	$55,000	3
Personal & Repair Services	$145,100	$57,100	$88,000	$40,000	2
Services to Dwellings / Buildings	$55,900	$21,600	$34,300	$37,000	1
Business & Professional Services	$617,400	$190,300	$427,100	$60,000	7
Eating and Drinking Places	$306,100	$57,900	$248,300	$27,000	9
Automobile Repair & Service	$123,800	$37,200	$86,500	$40,000	2
Entertainment Services	$47,400	$8,100	$39,300	$29,000	1
Health, Educ. & Social Services	$606,600	$70,200	$536,400	$55,000	10
Local Government	$460,000	$0	$460,000	$60,000	8
Other	$102,200	$50,000	$52,100	$42,000	1
Total	$4,091,900	$922,400	$3,169,900	$46,000	69

B. Local Government General Revenue by Type

TAXES:		USER FEES & CHARGES:	
Business Property Taxes	$143,800	Residential Permit / Impact Fees	$0
Residential Property Taxes	$370,100	Utilities & Other Govt. Enterprises	$230,700
General Sales Taxes	$50,700	Hospital Charges	$85,300
Specific Excise Taxes	$21,300	Transportation Charges	$7,700
Income Taxes	$14,400	Education Charges	$8,000
License Taxes	$13,600	Other Fees and Charges	$58,100
Other Taxes	$11,000	TOTAL FEES & CHARGES	$389,900
TOTAL TAXES	$624,900	TOTAL GENERAL REVENUE	$1,014,800

The Economic Impact of Home Building in a Typical Local Area

Income, Jobs, and Taxes Generated

Detailed Tables on Multifamily Construction

Impact of Building 100 Rental Apartments In a Typical Local Area

Summary

Total One-Year Impact: Sum of Phase I and Phase II:

Local Income	Local Business Owners' Income	Local Wages and Salaries	Local Taxes[1]	Local Jobs Supported
$11,693,000	$3,620,500	$8,072,300	$2,211,200	161

Phase I: Direct and Indirect Impact of Construction Activity:

Local Income	Business Owners' Income	Local Wages and Salaries	Local Taxes[1]	Local Jobs Supported
$7,403,300	$2,750,500	$4,652,700	$1,699,600	90

Phase II: Induced (Ripple) Effect of Spending the Income and Taxes from Phase I:

Local Income	Business Owners' Income	Local Wages and Salaries	Local Taxes[1]	Local Jobs Supported
$4,289,700	$870,000	$3,419,600	$511,600	71

Phase III: Ongoing, Annual Effect that Occurs When New Homes are Occupied:

Local Income	Local Business Owners' Income	Local Wages and Salaries	Local Taxes[1]	Local Jobs Supported
$2,640,600	$623,200	$2,016,900	$503,500	44

[1] The term local taxes is used as a shorthand for local government revenue from all sources: taxes, fees, fines, revenue from government-owned enterprises, etc.

Impact of Building 100 Rental Apartments in a Typical Local Area
Phase I—Direct and Indirect Impact of Construction Activity

A. Local Income and Jobs by Industry

Industry	Local Income	Local Business Owners' Income	Local Wages and Salaries	Wages & Salaries per Full-time Job	Number of Local Jobs Supported
Construction	$6,100,800	$2,346,500	$3,754,300	$55,000	68
Manufacturing	$400	$0	$400	$54,000	0
Transportation	$200	$100	$100	$29,000	0
Communications	$39,500	$13,600	$25,900	$77,000	0
Utilities	$9,300	$2,000	$7,300	$97,000	0
Wholesale and Retail Trade	$674,400	$148,800	$525,600	$33,000	16
Finance and Insurance	$36,000	$1,400	$34,600	$102,000	0
Real Estate	$152,500	$131,300	$21,200	$55,000	0
Personal & Repair Services	$24,900	$5,900	$19,000	$40,000	0
Services to Dwellings / Buildings	$15,000	$5,800	$9,200	$37,000	0
Business & Professional Services	$272,500	$66,600	$205,900	$63,000	3
Eating and Drinking Places	$7,800	$1,200	$6,500	$29,000	0
Automobile Repair & Service	$5,600	$1,700	$3,900	$40,000	0
Entertainment Services	$2,400	$200	$2,200	$33,000	0
Health, Educ. & Social Services	$700	$0	$700	$51,000	0
Local Government	$18,000	$0	$18,000	$78,000	0
Other	$43,300	$25,400	$17,900	$47,000	0
Total	$7,403,300	$2,750,500	$4,652,700	$52,000	90

B. Local Government General Revenue by Type

TAXES:		USER FEES & CHARGES:	
Business Property Taxes	$35,300	Residential Permit / Impact Fees	$1,367,200
Residential Property Taxes	$0	Utilities & Other Govt. Enterprises	$77,100
General Sales Taxes	$80,400	Hospital Charges	$35,700
Specific Excise Taxes	$5,200	Transportation Charges	$14,000
Income Taxes	$16,100	Education Charges	$14,500
License Taxes	$3,900	Other Fees and Charges	$47,200
Other Taxes	$2,800	TOTAL FEES & CHARGES	$1,555,800
TOTAL TAXES	$143,800	TOTAL GENERAL REVENUE	$1,699,600

Impact of Building 100 Rental Apartments in a Typical Local Area
Phase II—Induced Effect of Spending Income and Tax Revenue from Phase I

A. Local Income and Jobs by Industry

Industry	Local Income	Local Business Owners' Income	Local Wages and Salaries	Wages & Salaries per Full-time Job	Number of Local Jobs Supported
Construction	$231,600	$85,300	$146,300	$55,000	3
Manufacturing	$900	$0	$900	$52,000	0
Transportation	$10,500	$5,100	$5,400	$29,000	0
Communications	$210,600	$87,000	$123,600	$81,000	2
Utilities	$71,500	$15,100	$56,400	$97,000	1
Wholesale and Retail Trade	$554,000	$93,600	$460,300	$31,000	15
Finance and Insurance	$121,100	$4,700	$116,300	$90,000	1
Real Estate	$380,400	$157,700	$222,700	$55,000	4
Personal & Repair Services	$145,400	$52,200	$93,200	$40,000	2
Services to Dwellings / Buildings	$53,000	$20,500	$32,500	$37,000	1
Business & Professional Services	$533,000	$153,200	$379,900	$58,000	7
Eating and Drinking Places	$254,900	$50,000	$204,900	$27,000	8
Automobile Repair & Service	$111,700	$33,600	$78,100	$40,000	2
Entertainment Services	$30,800	$5,800	$25,000	$30,000	1
Health, Educ. & Social Services	$599,800	$66,700	$533,100	$55,000	10
Local Government	$900,400	$0	$900,400	$60,000	15
Other	$80,100	$39,500	$40,600	$43,000	1
Total	$4,289,700	$870,000	$3,419,600	$48,000	71

B. Local Government General Revenue by Type

TAXES:		USER FEES & CHARGES:	
Business Property Taxes	$124,400	Residential Permit / Impact Fees	$0
Residential Property Taxes	$0	Utilities & Other Govt. Enterprises	$178,800
General Sales Taxes	$43,900	Hospital Charges	$40,100
Specific Excise Taxes	$18,400	Transportation Charges	$8,100
Income Taxes	$14,000	Education Charges	$8,400
License Taxes	$11,900	Other Fees and Charges	$54,100
Other Taxes	$9,500	TOTAL FEES & CHARGES	$289,500
TOTAL TAXES	$222,100	TOTAL GENERAL REVENUE	$511,600

Impact of Building 100 Rental Apartments in a Typical Local Area
Phase III—Ongoing, Annual Effect That Occurs Because Units Are Occupied

A. Local Income and Jobs by Industry

Industry	Local Income	Local Business Owners' Income	Local Wages and Salaries	Wages & Salaries per Full-time Job	Number of Local Jobs Supported
Construction	$86,900	$32,900	$53,900	$55,000	1
Manufacturing	$600	$0	$500	$52,000	0
Transportation	$5,900	$2,800	$3,000	$29,000	0
Communications	$146,800	$60,800	$85,900	$81,000	1
Utilities	$29,300	$6,200	$23,100	$97,000	0
Wholesale and Retail Trade	$436,800	$65,200	$371,600	$34,000	11
Finance and Insurance	$80,500	$3,100	$77,400	$87,000	1
Real Estate	$499,100	$206,800	$292,200	$55,000	5
Personal & Repair Services	$77,700	$28,300	$49,500	$40,000	1
Services to Dwellings / Buildings	$33,100	$12,800	$20,300	$37,000	1
Business & Professional Services	$271,300	$76,300	$194,900	$53,000	4
Eating and Drinking Places	$194,200	$38,100	$156,100	$27,000	6
Automobile Repair & Service	$94,200	$28,300	$65,800	$40,000	2
Entertainment Services	$35,400	$4,800	$30,600	$29,000	1
Health, Educ. & Social Services	$367,200	$38,500	$328,800	$55,000	6
Local Government	$243,800	$0	$243,800	$60,000	4
Other	$37,800	$18,300	$19,500	$42,000	0
Total	$2,640,600	$623,200	$2,016,900	$46,000	44

B. Local Government General Revenue by Type

TAXES:		USER FEES & CHARGES:	
Business Property Taxes	$91,100	Residential Permit / Impact Fees	$0
Residential Property Taxes	$146,900	Utilities & Other Govt. Enterprises	$106,200
General Sales Taxes	$32,100	Hospital Charges	$41,500
Specific Excise Taxes	$13,500	Transportation Charges	$5,000
Income Taxes	$9,200	Education Charges	$5,200
License Taxes	$8,700	Other Fees and Charges	$37,100
Other Taxes	$7,000	TOTAL FEES & CHARGES	$194,900
TOTAL TAXES	$308,500	TOTAL GENERAL REVENUE	$503,500

The Impact of Home Building in a Typical Local Area

Income, Jobs, and Taxes Generated

Detailed Tables on Residential Remodeling

Impact of $1 Million Spent on Residential Remodeling in a Typical Local Area

Summary

Total One-Year Impact: Sum of Phase I and Phase II:

Local Income	Local Business Owners' Income	Local Wages and Salaries	Local Taxes[1]	Local Jobs Supported
$840,800	$254,800	$585,500	$70,700	11.5

Phase I: Direct and Indirect Impact of Construction Activity:

Local Income	Business Owners' Income	Local Wages and Salaries	Local Taxes[5]	Local Jobs Supported
$577,200	$194,500	$382,400	$36,000	7.2

Phase II: Induced (Ripple) Effect of Spending the Income and Taxes from Phase I:

Local Income	Business Owners' Income	Local Wages and Salaries	Local Taxes[1]	Local Jobs Supported
$263,600	$60,300	$203,100	$34,700	4.4

Phase III: Ongoing, Annual Effect that Occurs When New Homes are Occupied:

Residential Property Taxes
$11,200

[5] The term local taxes is used as a shorthand for local government revenue from all sources: taxes, fees, fines, revenue from government-owned enterprises, etc.

Impact of $1 Million Spent on Residential Remodeling in a Typical Local Area
Phase I—Direct and Indirect Impact of Construction Activity

A. Local Income and Jobs by Industry

Industry	Local Income	Local Business Owners' Income	Local Wages and Salaries	Wages & Salaries per Full-time Job	Number of Local Jobs Supported
Construction	$447,900	$152,700	$295,200	$55,000	5.3
Manufacturing	$0	$0	$0	$54,000	0.0
Transportation	$0	$0	$0	$29,000	0.0
Communications	$3,700	$1,300	$2,400	$78,000	0.0
Utilities	$800	$200	$600	$97,000	0.0
Wholesale and Retail Trade	$46,400	$10,200	$36,100	$35,000	1.0
Finance and Insurance	$8,100	$300	$7,900	$120,000	0.1
Real Estate	$20,100	$17,300	$2,800	$55,000	0.1
Personal & Repair Services	$2,300	$500	$1,700	$40,000	0.0
Services to Dwellings / Buildings	$1,500	$600	$900	$37,000	0.0
Business & Professional Services	$36,500	$8,400	$28,000	$66,000	0.4
Eating and Drinking Places	$1,300	$200	$1,100	$29,000	0.0
Automobile Repair & Service	$500	$100	$300	$40,000	0.0
Entertainment Services	$300	$0	$300	$33,000	0.0
Health, Educ. & Social Services	$100	$0	$100	$51,000	0.0
Local Government	$1,900	$0	$1,900	$74,000	0.0
Other	$5,800	$2,700	$3,100	$48,000	0.1
Total	$577,200	$194,500	$382,400	$53,000	7.2

B. Local Government General Revenue by Type

TAXES:		USER FEES & CHARGES:	
Business Property Taxes	$1,600	Residential Permit / Impact Fees	$12,500
Residential Property Taxes	$0	Utilities & Other Govt. Enterprises	$6,000
General Sales Taxes	$5,700	Hospital Charges	$2,800
Specific Excise Taxes	$200	Transportation Charges	$1,100
Income Taxes	$1,200	Education Charges	$1,100
License Taxes	$200	Other Fees and Charges	$3,400
Other Taxes	$100	TOTAL FEES & CHARGES	$26,900
TOTAL TAXES	$9,100	TOTAL GENERAL REVENUE	$36,000

Impact of $1 Million Spent on Residential Remodeling in a Typical Local Area
Phase II—Induced Effect of Spending Income and Tax Revenue from Phase I

A. Local Income and Jobs by Industry

Industry	Local Income	Local Business Owners' Income	Local Wages and Salaries	Wages & Salaries per Full-time Job	Number of Local Jobs Supported
Construction	$16,100	$5,900	$10,200	$55,000	0.2
Manufacturing	$0	$0	$0	$53,000	0.0
Transportation	$600	$300	$300	$29,000	0.0
Communications	$14,400	$6,000	$8,400	$81,000	0.1
Utilities	$5,000	$1,100	$3,900	$97,000	0.0
Wholesale and Retail Trade	$39,200	$6,600	$32,600	$31,000	1.1
Finance and Insurance	$8,400	$300	$8,000	$89,000	0.1
Real Estate	$26,800	$11,100	$15,700	$55,000	0.3
Personal & Repair Services	$9,800	$3,600	$6,200	$40,000	0.2
Services to Dwellings / Buildings	$3,500	$1,300	$2,100	$37,000	0.1
Business & Professional Services	$35,500	$10,300	$25,200	$58,000	0.4
Eating and Drinking Places	$17,900	$3,500	$14,400	$27,000	0.5
Automobile Repair & Service	$8,000	$2,400	$5,600	$40,000	0.1
Entertainment Services	$2,200	$400	$1,800	$30,000	0.1
Health, Educ. & Social Services	$43,000	$4,800	$38,200	$55,000	0.7
Local Government	$27,700	$0	$27,700	$60,000	0.5
Other	$5,500	$2,700	$2,800	$43,000	0.1
Total	$263,600	$60,300	$203,100	$46,000	4.4

B. Local Government General Revenue by Type

TAXES:		USER FEES & CHARGES:	
Business Property Taxes	$8,700	Residential Permit / Impact Fees	$0
Residential Property Taxes	$0	Utilities & Other Govt. Enterprises	$12,100
General Sales Taxes	$3,100	Hospital Charges	$2,500
Specific Excise Taxes	$1,300	Transportation Charges	$500
Income Taxes	$900	Education Charges	$500
License Taxes	$800	Other Fees and Charges	$3,600
Other Taxes	$700	TOTAL FEES & CHARGES	$19,300
TOTAL TAXES	$15,500	TOTAL GENERAL REVENUE	$34,700

NAHB

The Economic Impact of Home Building in a Typical Local Area

Income, Jobs, and Taxes Generated

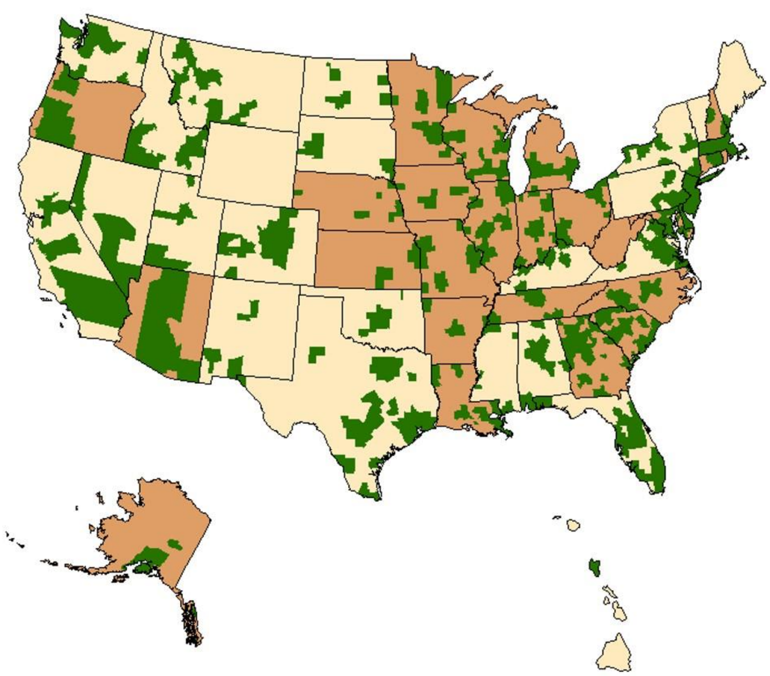
Background and a Brief Description of the Model Used to Estimate the Economic Benefits

In 1996, the Housing Policy Department of the National Association of Home Builders (NAHB) developed an economic model to estimate the local economic benefits of home building. Although at first calibrated to a typical metropolitan area using national averages, the model could be adapted to a specific local economy by replacing national averages with specific local data for key housing market variables. The initial version of the model could be applied to single-family construction, multifamily construction, or a combination of the two.

Since 1997, NAHB has used the model to produce customized reports on the impact of home building in various parts of the country. As of February 2012, NAHB has produced over 800 of these customized reports, analyzing residential construction in various metropolitan areas, non-metropolitan counties, and states (see map below).

Areas Covered by NAHB Local Impact Studies

The dark green shading indicates studies covering metro areas and non-metro counties; the orange shading studies covering an entire state.



The reports have analyzed the impacts of specific housing projects, as well as total home building in areas as large as entire states. In 2002, NAHB developed new versions of the model to analyze active adult housing projects and multifamily development financed with the Low-Income Housing Tax Credit, then in 2005 a version of the model that analyzes remodeling.

Results from NAHB's local impact model have been used by outside organizations such as universities, state housing authorities and affordable housing agencies:

- The Shimburg Center for Affordable Housing at the University of Florida used results from the NAHB model to establish that "the real estate taxes paid year after year are the most obvious long-term economic benefit to the community. Probably the second most obvious long-term economic benefit is the purchases made by the family occupying the completed home." www.shimberg.ufl.edu/pdf/Newslett-June02.pdf

- The Louisville Affordable Housing Trust Fund (AHTF) used results from the NAHB model to determine the initial one-year impact and the ongoing annual effect that occurs when new homes are occupied. This analysis was performed to help justify the creation of a commission to oversee the newly established AHTF to insure that it works at "finding creative ways to create a sustainable and renewable fund to provide affordable housing opportunities throughout the Louisville community." www.openthedoorlouisville.org/housing-trust/economic-growth

- The Illinois Housing Development Authority used the NAHB model to determine that "the Authority's new construction activity in single and multifamily housing....resulted in the creation of 4,256 full-time jobs in construction and construction-related industries." The Authority also used the NAHB impact model to determine the federal, state and local taxes and fees generated from new construction and substantial rehabilitation activity. www.ihda.org/admin/Upload/Files/94c0ecf7-a238-4be3-90bd-6043cfae81ea.pdf

- The Stardust Center at the Arizona State University used "the model used and developed by the NAHB to assess the immediate economic impacts of affordable housing" by phase including the construction effect, the construction ripple, and on-going impacts. This was done to show "that permanent, affordable and geographically accessible housing provides numerous benefits both to individual families and to the broader community." www.orangecountyfl.net/NR/rdonlyres/efo5wiffiqvqqgn2s35shus5i4lwdgqbcxpck2dddnds3msj5qs26ubzllsfl6s6rrwnmtkq4dypnjrdrdzei2llq5g/Socialeconomicimpacts.pdf

- The Center for Applied Economic Research at Montana State University used "results from an input-output model developed by the National Association of Home Builders to assess the impacts to local areas from new home construction." The results show that "the construction industry contributes substantially to Montana's economy accounting for 5.5 percent of Gross State Product."

- The Housing Education and Research Center at Michigan State University also adopted the NAHB approach: "The underlying basis for supporting the implementation of this [NAHB] model on Michigan communities is that it provides quantifiable results that link new residential development with commercial and other forms of development therefore illustrating the overall economic effects of residential growth."

- The Center for Economic Development at the University of Massachusetts found that "Home building generates substantial local economic activity, including income, jobs, and revenue for state and local governments. These far exceed the school costs-to-property-tax ratios. …these factors were evaluated by means of a quantitative assessment of data from the National Association of Home Builder's Local Impact of Home Building model."

- Similarly, the Association of Oregon Community Development Organizations decided to base its analysis of affordable housing on the NAHB model, stating that "This model is widely respected and utilized in analyzing the economic impact of market rate housing development," and that, compared to alternatives, it "is considered the most comprehensive and is considered an improvement on most previous models." www.aocdo.org/docs/EcoDevoStudyFinal.pdf

- The Boone County Kentucky Planning Commission included results from the NAHB model in its 2005 Comprehensive Report. The Planning Commission used values from the impact model to quantify the increase in local income, taxes, revenue, jobs, and overall local economic impacts in the Metro Area as a result of new home construction.

The NAHB model is divided into three phases. Phases I and II are one-time effects. Phase I captures the effects that result directly from the construction activity itself and the local industries that contribute to it. Phase II captures the effects that occur as a result of the wages and profits from Phase I being spent in the local economy. Phase III is an ongoing, annual effect that includes property tax payments and the result of the completed unit being occupied.

Phase I: Local Industries Involved in Home Building

The jobs, wages, and local taxes (including permit, utility connection, and impact fees) generated by the actual development, construction, and sale of the home. These jobs include on-site and off-site construction work as well as jobs generated in retail and wholesale sales of components, transportation to the site, and the professional services required to build a home and deliver it to its final customer.

Phase II: Ripple Effect

The wages and profits for local area residents earned during the construction period are spent on other locally produced goods and services. This generates additional income for local residents, which is spent on still more locally produced goods and services, and so on. This continuing recycling of income back into the community is usually called a ***multiplier*** or ***ripple*** effect.

Phase III: Ongoing, Annual Effect

The local jobs, income, and taxes generated as a result of the home being occupied. A household moving into a new home generally spends about three-fifths of its income on goods and services sold in the local economy. A fraction of this will become income for local workers and local businesses proprietors. In a typical local area, the household will also pay 1.25 percent of its income to local governments in the form of taxes and user fees, and a fraction of this will become income for local government employees. This is the first step in another set of economic ripples that cause a permanent increase in the level of economic activity, jobs, wages, and local tax receipts.

Modeling a Local Economy

The model defines a local economy as a collection of industries and commodities. These are selected from the detailed benchmark input-output tables produced by the U.S. Bureau of Economic Analysis. The idea is to choose goods and services that would typically be produced, sold, and consumed within a local market area. Laundry services would qualify, for example, while automobile manufacturing would not. Both business-to-business and business-to-consumer transactions are considered. In general the model takes a conservative approach and retains a relatively small number of the available industries and commodities. Of the roughly 400 industries and commodities provided in the input-output files, the model uses only 97 commodities and 99 industries.

The design of the model implies that a local economy should include not only the places people live, but also the places where they work, shop, typically go for entertainment, etc. This corresponds reasonably well to the concepts of Metropolitan Statistical Areas and Metropolitan Divisions, areas defined by the U.S. Office of Management and Budget based on local commuting patterns. Outside of these officially defined metropolitan areas, NAHB has determined that a county will usually satisfy the model's requirements.

For a particular local area, the model adjusts the indirect business tax section of the national input-output accounts to account for the fiscal structure of local governments in the area. The information used to do this comes primarily from the U.S. Census Bureau's Census of Governments. Wages and salaries are extracted from the employee compensation section of the input-output accounts on an industry-by-industry basis. In order to relate wages and salaries to employment, the model incorporates data on local wages per job published by the Bureau of Economic Analysis.

Phase I: Construction

In order to estimate the local impacts generated by home building, it is necessary to know the sales price of the homes being built, how much raw land contributes to the final price, and how much the builder and developer pay to local area governments in the form of permit, utility connection, impact, and other fees. This information is not generally available from national sources and in most cases must be provided by representatives from the area in question who have specialized knowledge of local conditions.

The model subtracts raw land value from the price of new construction and converts the difference into local wages, salaries, business owners' income, and taxes. This is done separately for each of the local industries. In addition, the taxes and fees collected by local governments during the construction phase generate wages and salaries for local government employees. Finally the number of full time jobs supported by the wages and salaries generated in each private local industry and the local government sector is estimated.

Summary of Phase I

Value of Construction
+
Services Provided at Closing
+
Permit / Hook-up / Impact Fees

↓

Model of the Local Economy

↓

Local Income and Taxes

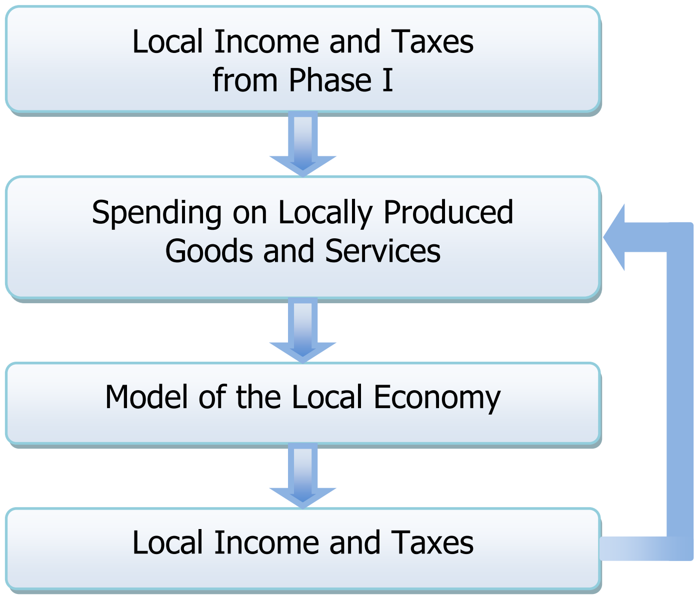
Phase II: The Construction Ripple

Clearly, the local residents who earn income in Phase I will spend a share of it. Some of this will escape the local economy. A portion of the money used to buy a new car, for example, will become wages for autoworkers that are likely to live in another city, and increased profits for stockholders of an automobile manufacturing company who are also likely to live elsewhere. A portion of the spending, however, will remain within, and have an impact on, the local economy. The car is likely to be purchased from a local dealer and generate income for a salesperson that lives in the area, as well for local workers who provide cleaning, maintenance, and other services to the dealership. Consumers also are likely to purchase many services locally, as well as to pay taxes and fees to local governments.

This implies that the income and taxes generated in Phase I become the input for additional economic impacts analyzed in what we call Phase II of the model. Phase II begins by estimating how much of the added income households spend on each of the local commodities. This requires detailed analysis of data from the Consumer Expenditure (CE) Survey, which is conducted by the U.S. Bureau of Labor Statistics primarily for the purpose of determining the weights for the Consumer Price Index. The analysis produces household spending estimates for 52 local commodities. The remainder of the 97 local commodities enter the model only as business-to-business transactions.

The model then translates the estimated local spending into local business owners' income, wages and salaries, jobs, and taxes. This is essentially the same procedure applied to the homes sold to consumers in Phase I. In Phase II, however, the procedure is applied simultaneously to 56 locally produced and sold commodities.
In other words, the model converts the local income earned in Phase I into local spending, which then generates additional local income. But this in turn will lead to additional spending, which will generate more local income, leading to another round of spending, and so on. Calculating the end result of these economics is a straightforward exercise in mathematics.

Summary of Phase II



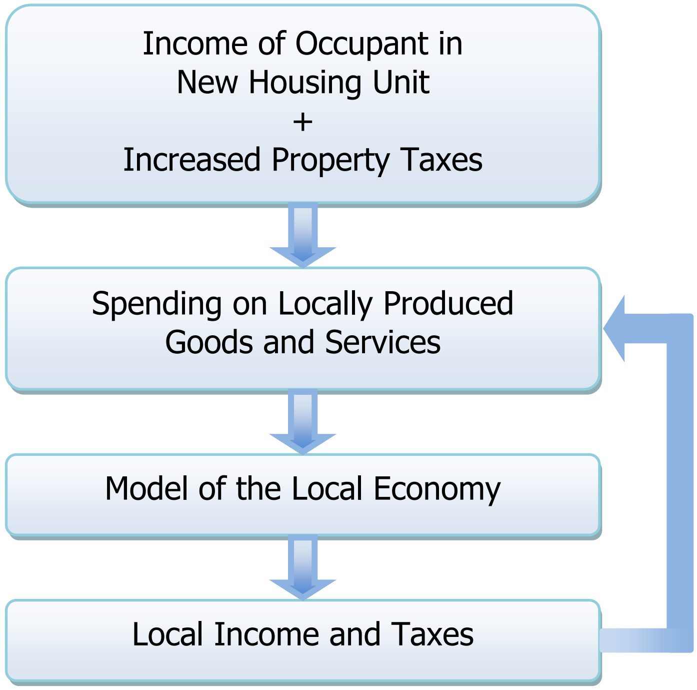
Phase III: Ongoing Impacts

Like Phase II, Phase III involves computing the sum of successive ripples of economic activity. In Phase III, however, the first ripple is generated by the income and spending of a new household (along with the additional property taxes local governments collect as a result of the new structure). This does not necessarily imply that all new homes must be occupied by households moving in from outside the local area. It may be that an average new-home household moves into the newly constructed unit from elsewhere in the same local area, while average existing-home household moves in from outside to occupy the unit vacated by the first household. Alternatively, it may be that the new home allows the local area to retain a household that would otherwise move out of the area for lack of suitable housing.

In any of these cases, it is appropriate to treat a new, occupied housing unit as a net gain to the local economy of one household with average characteristics for a household that occupies a new home. This reasoning is often used, even if unconsciously, when it is assumed that a new home will be occupied by a household with average characteristics—for instance, an average number of children who will consume public education.

To estimate the impact of the net additional households, Phase III of the model requires an estimate of the income of the households occupying the new homes. The information used to compute this estimate comes from several sources, but primarily from an NAHB statistical model based on decennial census data. Phase III of the local impact model then estimates the fraction of income these households spend on various local commodities. The spending tendencies are estimated with CE data in a fashion similar to that described under Phase II. The model also estimates the amount of local taxes the households pay each year. These estimates are based on Census of Governments data with the exception of residential property taxes, which are treated separately, most often with specific information obtained from a local source. Finally, a total ripple effect is computed in a way similar to the procedure outlined above under Phase II.

Summary of Phase III



The details covered here provide a brief description of the model NAHB uses to estimate the local economic benefits of home building. For a more complete description, see the technical documentation at the end of the report. For additional information about the model, or questions about applying it to a particular local area, contact one of the following in NAHB's Economics and Housing Policy Group:

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National Association of Home Builders

Local Impact of Home Building

Technical Documentation for the NAHB Model Used to Estimate Income, Jobs and Taxes

March 2015

Paul Emrath
Housing Policy Department

Technical Documentation for the NAHB Model Used to Estimate Income, Jobs and Taxes

The Housing Policy Department of the National Association of Home Builders (NAHB) maintains an economic model that it uses to estimate the local economic benefits of home building. The NAHB model is divided into three phases. Phases I and II are one-time effects. Phase I captures the effects that result directly from the construction activity itself and the local industries that contribute to it. Phase II captures the effects that occur as a result of the wages and profits from Phase I being spent in the local economy. Phase III is an ongoing, annual effect that includes property tax payments and the result of the completed unit being occupied.

The model can be customized to a specific local economy by replacing key housing market variables. This document explains describes the sources of data used and explains how the estimates are generated.

Modeling a Local Economy

In the NAHB model, a local economy is defined as a collection of industries and commodities, selected from the 2007 benchmark input-output accounts produced by the U.S. Bureau of Economic Analysis (BEA). These accounts are generally based on the North American Industry Classification System (NAICS), although BEA combines and otherwise modifies the NAICS categories for purposes of the input-output estimates. NAHB's model uses the most detailed (6-digit) industry codes in order to parse industries and commodities as precisely as possible and include only those that are generally local in nature. BEA's 2007 benchmark input-output tables contain a total of 389 industries at the 6-digit level of detail. NAHB's local economy retains the following 99:

	IO Code	*Detailed Industry Name*
1	111400	Greenhouse, nursery, and floriculture production
2	212310	Stone mining and quarrying
3	221100	Electric power generation, transmission, and distribution
4	221200	Natural gas distribution
5	221300	Water, sewage and other systems
6	230301	Nonresidential maintenance and repair
7	230302	Residential maintenance and repair
8	233210	Health care structures
9	233411	Single-family residential structures
10	233412	Multifamily residential structures
11	323120	Support activities for printing
12	339950	Sign manufacturing
13	420000	Wholesale trade
14	441000	Motor vehicle and parts dealers
15	445000	Food and beverage stores
16	452000	General merchandise stores
17	485000	Transit and ground passenger transportation
18	492000	Couriers and messengers
19	493000	Warehousing and storage
20	511110	Newspaper publishers
21	515100	Radio and television broadcasting
22	515200	Cable and other subscription programming
23	517110	Wired telecommunications carriers
24	517210	Wireless telecommunications carriers (except satellite)

25	518200	Data processing, hosting, and related services
26	519130	Internet publishing and broadcasting and Web search portals
27	524200	Insurance agencies, brokerages, and related activities
28	525000	Funds, trusts, and other financial vehicles
29	531000	Real estate
30	532100	Automotive equipment rental and leasing
31	532400	Commercial and industrial machinery and equipment rental and leasing
32	533000	Lessors of nonfinancial intangible assets
33	541100	Legal services
34	541200	Accounting, tax preparation, bookkeeping, and payroll services
35	541300	Architectural, engineering, and related services
36	541400	Specialized design services
37	541511	Custom computer programming services
38	541512	Computer systems design services
39	541800	Advertising, public relations, and related services
40	541920	Photographic services
41	541940	Veterinary services
42	561100	Office administrative services
43	561200	Facilities support services
44	561300	Employment services
45	561400	Business support services
46	561600	Investigation and security services
47	561700	Services to buildings and dwellings
48	561900	Other support services
49	562000	Waste management and remediation services
50	611100	Elementary and secondary schools
51	621100	Offices of physicians
52	621200	Offices of dentists
53	621300	Offices of other health practitioners
54	621400	Outpatient care centers
55	621600	Home health care services
56	621900	Other ambulatory health care services
57	622000	Hospitals
58	624100	Individual and family services
59	624400	Child day care services
60	711100	Performing arts companies
61	711200	Spectator sports
62	712000	Museums, historical sites, zoos, and parks
63	713100	Amusement parks and arcades
64	713200	Gambling industries (except casino hotels)
65	713900	Other amusement and recreation industries
66	722110	Full-service restaurants
67	722211	Limited-service restaurants
68	811100	Automotive repair and maintenance
69	811200	Electronic and precision equipment repair and maintenance
70	811300	Commercial and industrial machinery and equipment repair and maintenance
71	811400	Personal and household goods repair and maintenance
72	812100	Personal care services
73	812200	Death care services
74	812300	Dry-cleaning and laundry services
75	812900	Other personal services
76	813100	Religious organizations
77	2332A0	Commercial structures, including farm structures
78	2332B0	Other nonresidential structures
79	2334A0	Other residential structures
80	4A0000	Other retail
81	517A00	Satellite, telecommunications resellers, and all other telecommunications

82	5191A0	News syndicates, libraries, archives and all other information services
83	522A00	Nondepository credit intermediation and related activities
84	523A00	Securities and commodity contracts intermediation and brokerage
85	52A000	Monetary authorities and depository credit intermediation
86	532A00	Consumer goods and general rental centers
87	54151A	Other computer related services, including facilities management
88	5419A0	Marketing research & other miscellaneous professional, scientific, & tech. services
89	611B00	Other educational services
90	623A00	Nursing and community care facilities
91	623B00	Residential mental retardation, mental health, substance abuse and other facilities
92	624A00	Community food, housing, and other relief services, including rehabilitation services
93	722A00	All other food and drinking places
94	813A00	Grantmaking, giving, and social advocacy organizations
95	813B00	Civic, social, professional, and similar organizations
96	S00201	State and local government passenger transit
97	S00202	State and local government electric utilities
98	S00203	Other state and local government enterprises
99	S00700	State and local general government

In contrast to the industry categories used in the previous (2002) version of the benchmark input-output tables, the 2007 version shows considerably more detail in the construction sector, and breaks retail trade into several categories.

In the input-output accounts, commodities generally correspond to industries, with the exception of "state and local government passenger transit" and "state and local government electric service," for which there is no distinct commodity (passenger transit and electric services are defined as input-output commodities irrespective of which industry produces them), so the local economy as defined in the NAHB model consists of 99 industries and 97 commodities.

The above list includes industries in trade, construction, finance, transportation, and services—but excludes virtually all manufacturing, mining, and agriculture, under the presumption that the markets for these products are regional—if not national or international—in nature.

The exclusion of many industries is a distinguishing feature of the NAHB local impact model and is consistent with the overall intent of the model: to analyze the impact of locating a housing unit and the household that occupies it in one place rather than another. From this perspective, a house built in Seattle, Washington should not cause additional airplanes to be built or additional software to be produced, even though the occupants of a home built in Seattle may use software produced in Seattle and travel on planes built in Seattle. Because these households would be likely to use these products the same way even if they lived in some other metropolitan area, use of these products is not a function of the home's location. Hence, industries like software publishing and aircraft manufacturing are excluded from the model.

Based on the industries and commodities described above, a "total local requirements" matrix is constructed that shows the total output required from each of the local industries to produce $1 of each local commodities.

To show the derivation of this matrix, let

$\boldsymbol{c}$ = a 97-element column vector of commodity outputs

$\boldsymbol{g}$ = a 99-element column vector of industry outputs

$\boldsymbol{V}$ = a 99×97 subset of the benchmark make table that shows how much of each commodity is produced by each industry

$\boldsymbol{h}$ = a 99-element column vector showing how much scrap is produced by each industry

$\boldsymbol{U}$ = a 97×99 subset of the benchmark use table that shows how much of each commodity used as an input by each industry. Coefficients for the wholesale trade commodity are set to zero, assuming that these transactions are often non-local in nature. The wholesale trade industry produces a considerable amount of the retail trade commodity. The effect of this is to retain retail trade in the model, irrespective of which industry produces it, but to exclude wholesale trade activities.

The following matrices can then be defined through standard input-output algebra:

$\boldsymbol{B} = \boldsymbol{U}\hat{\boldsymbol{g}}^{-1}$ the direct requirements matrix, showing the amount of each commodity needed as a direct input to produce $1 of each industry's output. (The symbol ˆ indicates a matrix created from a vector by placing the vector=s elements on the matrix diagonal.) This is simply the use table scaled by industry output.

$\boldsymbol{j} = \hat{\boldsymbol{g}}^{-1}\boldsymbol{h}$ a vector showing scrap as a fraction of each industry's output. Many of the elements of this vector are zero in the NAHB local impact model, which excludes most of the manufacturing sector.

$\boldsymbol{D} = \boldsymbol{V}\hat{\boldsymbol{c}}^{-1}$ a 99×97 market share matrix, or the make table scaled by commodity output. $\boldsymbol{D}$ shows the fraction of each commodity (excluding scrap) produced by each industry.

$\boldsymbol{F} = (\boldsymbol{I}-\hat{\boldsymbol{j}})^{-1}\boldsymbol{D}$ a 99×97 matrix showing, for $1 worth of each commodity, the fraction produced by each industry. In short, $\boldsymbol{F}$ is $\boldsymbol{D}$ adjusted for scrap. $\boldsymbol{F}$ is often called a transformation matrix, because it can be used to transform commodities into the output of industries and vice versa.

$$\textbf{\textit{Total Local Requirements}} = \boldsymbol{F}(\boldsymbol{I}-\boldsymbol{BF})^{-1}$$

The total local requirements matrix translates local commodities into the output of local industries. The NAHB model is designed to capture only a fraction of the output: the fraction that becomes either income for local households or revenue for local governments. These fractions are estimated from a combination of value added components of the input-output tables, plus information taken from other BEA industry accounts. In the BEA accounts, the final price of a commodity is the sum of intermediate outputs plus value added by the industry. To avoid double counting, the NAHB model retains only the value added in each local industry for further analysis.

BEA's input-output accounts break value added into three components: compensation of employees, taxes on production and imports (TOPI), and gross operating surplus. In the NAHB model, local income is derived from compensation of employees and gross operating surplus.

The following table shows information taken from BEA accounts used in this derivation:

	Wages & Salaries per $ of Employee Compensation	Other Corp. as a % of Gross Operating Surplus	Other Non-Corp. as a % of Gross Operating Surplus
Farms	85.98%	77.63%	28.12%
Mining, except oil and gas	82.18%	12.40%	71.60%
Utilities	74.17%	9.32%	84.32%
Construction	83.11%	68.10%	29.88%
Miscellaneous manufacturing	71.19%	10.16%	87.83%
Printing and related support activities	81.90%	11.75%	85.14%
Wholesale trade	85.93%	15.89%	82.08%
Motor vehicle and parts dealers	85.39%	27.06%	69.55%
Food and beverage stores	81.55%	27.06%	69.55%
General merchandise stores	81.30%	27.06%	69.55%
Other retail	84.09%	27.06%	69.55%
Transit and ground passenger transportation	81.66%	76.22%	22.04%
Other transportation and support activities	81.76%	23.56%	74.53%
Warehousing and storage	81.97%	34.38%	63.45%
Publishing industries (includes software)	84.22%	14.36%	84.75%
Broadcasting and telecommunications	81.49%	26.07%	71.94%
Information and data processing services	84.23%	24.24%	74.30%
Federal Reserve banks, credit intermediation, related act.	85.01%	1.98%	87.89%
Securities, commodity contracts, and investments	87.89%	-2.28%	107.02%
Insurance carriers and related activities	84.36%	6.88%	120.64%
Funds, trusts, and other financial vehicles	57.88%	-16.43%	114.13%
Real estate (estimated by NAHB)	85.90%	100.00%	0.00%
Rental & leasing services and lessors of intangible assets	86.04%	32.70%	64.08%
Legal services	84.92%	76.96%	21.03%
Computer systems design and related services	87.90%	42.09%	53.54%
Misc. professional, scientific, and technical services	86.62%	57.56%	40.53%
Administrative and support services	84.67%	57.36%	40.59%
Waste management and remediation services	79.35%	13.44%	84.75%
Educational services	81.12%	39.22%	54.48%
Ambulatory health care services	82.70%	53.75%	42.32%
Hospitals	82.54%	42.00%	45.89%
Nursing and residential care facilities	80.79%	42.00%	45.89%
Social assistance	82.09%	48.30%	47.41%
Performing arts, spectator sports, museums, related act.	86.80%	70.36%	28.48%
Amusements, gambling, and recreation industries	84.18%	8.46%	90.01%
Food services and drinking places	85.50%	38.55%	58.57%
Other services, except government	85.92%	82.52%	15.81%
State and local government enterprises	68.40%	NA	NA
State and local general government	68.17%	NA	NA

Due to data limitations, ratios from relatively broad categories are sometimes applied to more narrowly defined local industries. For example, ratios for the broad categories "farms" is applied to a much more narrowly defined local industry "Greenhouse, nursery, and floriculture production."

Treatment of real estate is less straightforward than it might be, because the input-output accounts provide one set of estimates for real estate with no detail within that relatively broad industry. When analyzing a local housing economy, it is desirable to account for residential real estate brokers and property managers, each which has well-known distinctive characteristics. NAHB uses data from the U.S. Census Bureau's 2007 Economic Census to estimate a separate set of coefficients for residential real estate brokers. Coefficients derived this way allocate a relatively small 8 percent of value added to wages and salaries, because most realtor offices are organized as a group of businesses where each broker legally counts as proprietor rather than an employee. The modified coefficients are applied to broker fees that arise in the transaction of single-family homes built for sale (as opposed to custom homes built by a general contractor on home owners' land) and individual multifamily condominiums to the ultimate owner-occupants. Any broker fees that that may be charged in the sale of multifamily rental buildings are assumed to be paid to non-local entities and excluded from the model.

Similarly, owners of rental buildings are considered non-local and excluded. However, for obvious reasons, managing the properties needs to be done locally. To handle this, except for the broker fees mentioned above, the NAHB model treats payments made to the real estate sector (primarily rental payments made by tenants in new multifamily buildings) as revenue for non-local property lessors (the federal government's term for what is elsewhere typically called a rental property owner) who then employ local businesses to manage the property. In practice this means subtracting about 57 percent of the rental payment and treating the remaining 43 percent as a local payment for management services. Again, this ratio was computed using detailed industry data from the 2007 Economic Census.

A key feature of the NAHB local impact model is the way it translates the wages and salaries from BEA accounts into local jobs, measured in full-time equivalents (FTEs); i.e., enough work to keep a person employed full-time for a year, based on the hours typically worked by full-time employees in a given industry. Indeed, when users of NAHB's local impact studies cite a single number from one of the studies, it is usually this one.

In general, the translation is accomplished using data on wages per job in each local industry from the Quarterly Census of Employment and Wages (QCEW) produced by the U.S. Bureau of Labor Statistics (BLS). The QCEW provides data for each county in the country, although it may be suppressed in particular cases for some industries due to a small sample size. To reduce the chances of missing data and produce an estimate that can more easily be adjusted for inflation, annual rather than quarterly QCEW data are used. If annual data for a particular industry in a particular local area are missing, they are imputed based on national wages per job in that industry, adjusted by the ratio of local to national wages per job across all industries. If QCEW data are not yet available for the year of construction being analyzed (as is typically the case), wages per job in each industry is inflated using HUD's estimates of median family income, which are available for the current year and for each state and local area in the country. Job counts in the QCEW are based on payroll employment and therefore include part-time as well as full-time workers. The QCEW job counts are converted to FTEs using the ratio of FTEs to jobs in each industry from BEA's national industry accounts.

The estimates of local income in the NAHB model exclude most corporate profits, based on the rationale that ownership of most corporations is national or international in scope. Even if a household living in a particular metropolitan area buys a product manufactured by a corporation located in in that metropolitan area, profits derived from the sale are likely to be distributed to shareholders living in other locations.

The model makes an exception for subchapter S corporations, which tend to be smaller and more local in nature than C corporations. S corporations also tend to be relatively common in particular industries, such as residential construction. The Internal Revenue Service (IRS) provides information on business receipts by form of business and industry, and this is used to decompose corporate profits into profits for S-corporations and C-corporations. The IRS tables provide relatively limited industry detail, so again percentages for a broadly defined industry are sometimes applied to several 6-digit NAICS industries. The S-corporation profits by industry are then counted as part of local income.

In general, local government revenue is estimated industry by industry, as a function of both local income and TOPI. TOPI includes taxes imposed at the federal, state and local level. BEA national accounts show that, in the year of the most recent Census of Governments, 9.2 percent of TOPI is federal (almost all excise taxes and custom duties). The Census of Governments is then used to further decompose TOPI into 42.4 percent collected by state governments and 48.4 collected by local governments (the largest components of state and local TOPI being sales and property taxes). Thus, the NAHB model uses a base of 90.8 or 48.4 percent of TOPI in each local industry as a starting point, depending on whether a state or local economy is being analyzed.

A distinctive feature of the NAHB model is the way it further employs Census of Governments data to customize the government finances to a particular area. Census of Governments data are available for each of the roughly 89,000 units of government in the U.S., and the NAHB model reads in every line item for every government within the local area being analyzed. Aggregated across all local (or state and local) governments in the U.S., the ratio of TOPI to personal income is 2.776 (or 6.595) percent. This ratio is also calculated for the area being analyzed and used to adjust TOPI by industry up or down. Personal income is used as the base of the ratio, because this is a measure that is available for every local area in the country.

There are two substantial exceptions to this procedure, as discussed below in the sections on Phase I and Phase III. In the case of residential property taxes and sales taxes paid on construction materials, specific information is collected for the construction being analyzed and fed into the model instead.

Census of Governments data is also used to customize taxes and fees paid by the workers and local proprietors who receive income as a result of the home building activity, and, where applicable, corporate income taxes to a local area. Aggregated over all local (or state and local) governments in the U.S., taxes and fees paid by individuals sum to 4.198 (or 7.843) percent of personal income. Again, equivalent ratios are calculated for the area being analyzed and used to customize the government revenue estimates.

To the extent that S corporations pay taxes to state and local governments, these taxes are also counted on the assumption that stockholders of S corps reside in the same area as the company income.

The general procedure for customizing government revenue to a specific local area (or state) can be summarized as follows:

Personal taxes =
    4.198% (or 7.843%) × Local Personal Income × Local Factor 1

Business taxes =
    48.4% (or 90.8%) × TOPI in Local Industries × Local Factor 2 +
    6.349% × Corporate Profits in Local Industries × Local Factor 3

where the three local factors are derived on a case by case basis from data in the most recent Census of Governments. In practice, Local Factor 3 will usually be zero, as few local governments impose a tax on corporate profits.

The distinguishing aspect of this procedure is that it preserves the industry structure of the input-output accounts while being consistent with revenue being collected by all governments in the area of analysis, as reported by the governments themselves to the U.S. Census Bureau.

Phase I: Construction

As shown diagrammatically in "Background and a Brief Description of the Model Used to Estimate the Economic Benefits", Phase I of the model feeds the dollar amount of construction and ancillary locally produced items into the income and tax matrices derived from the model total local requirements. Accounting for everything that goes into building a home and delivering it to its customer is more complicated than it may at first appear.

For one thing, the Census Bureau subtracts several items from construction value before providing the numbers to BEA for use in the input-output and related GDP accounts. On new homes built for sale, the Census Bureau subtracts 1.1 percent of the sales price for landscaping, 0.5 percent for appliances, 2.9 percent for realtor and brokers fees, and 2.7 percent for marketing and finance costs. There are equivalent subtractions for custom homes (i.e., homes where the builder functions as a general contractor for a home built on the customer's lot).

However, the landscaping and purchases of appliances and marketing/broker services associated with a newly built home clearly are attributable to the construction of the home. Phase I of the NAHB model therefore accounts for these items as separate purchases of the local construction, retail trade, and real estate industries. For retail trade, only the gross margin of appliance purchases are counted. Gross margins for different types of retailers are available from the Census Bureau's Annual Retail Trade Survey.

In addition, there are settlement or closing costs associated with transferring property from a builder to the ultimate owner. In a typical case, these costs are shared between buyers and sellers. Construction value as defined in the input-output accounts includes closing costs if they are paid by the seller, but not the buyer. When the local impact model was first developed, NAHB verified these details with economists at BEA.

In order to estimate both closing costs as a fraction of the home's price and the share of these costs the buyer pays, the NAHB model uses national average data compiled by the U.S.

Department of Housing and Urban Development.[6] The share of settlement costs paid for by the buyer for loan origination and discount fees, title and private mortgage insurance, and legal fees are counted as output of the local depository credit intermediation, insurance, and legal services industries, respectively.

Another category of closing costs sometimes paid by the buyer is mortgage or deed transfer taxes. Phase I of the NAHB model does not automatically include an amount for transfer taxes. In most (but not all) instances, these taxes are imposed by state, rather than local, governments. To the extent that transfer taxes apply in a specific case, that information needs to be supplied by the local entity requesting the analysis.

The local entity requesting the analysis is also asked to provide information on whether or not sales taxes are imposed on construction materials and supplies; and, if so, the relevant sales tax rate. The model then applies the relevant rate to 34.1 percent of construction value, assuming that materials account for that share of the final value of a housing unit. The figure of 34.1 was calculated from the ratio of materials to construction value for several categories of construction businesses in the Economic Census, including trade contractors. The calculation takes subcontracing into account, as a large fraction of the final construction value of a housing unit is subcontracted to businesses that may also purchase materials.

Phase II: The Construction Ripple

Phase I of the model translates home building activity into income for local workers and business proprietors, and revenue for local governments. This output serves as the input for Phase II, as part of the local income generated will be spent, generating more income, generating more spending, and so on. These spending ripples damp and eventually converge to a limit, which is the ultimate ripple or multiplier effect.

To convert local income to local spending, the model requires information about local household spending tendencies. Detailed spending information at the household level is available from the Consumer Expenditure (CE) Survey, produced by the U.S. Bureau of Labor Statistics (BLS) primarily for the purpose of determining the weights for the Consumer Price Index.[7]

The CE consists of two different types of surveys: 1) an interview survey that collects data on monthly expenditures as well as information on income and household characteristics, and 2) a diary survey that collects data on weekly expenditures of frequently purchased items. These are two separate surveys, each designed individually with weights that aggregate to an estimate of total spending in the U.S. When it estimates aggregate measures of consumer spending, BLS combines results from the two different types of surveys in a manner it does not disclose.

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[6] Report to Congress on the Need for Further Legislation in the Area of Real Estate Settlements, 1981, Exhibits II-1 and II-6.

[7] Technically, in the Consumer Expenditure Survey, the unit of measurement is actually not a household, but a *Consumer Unit*, a group of individuals who live in the same house and make joint purchasing decisions. There may be more than one Consumer Unit in a household.

The NAHB local impact model uses only data from the interview survey, primarily to avoid the need for arbitrary decisions about which spending items to take from which survey. Based on its CE interview survey, BLS produces a public use microdata set consisting of quarterly files with household characteristics (including income), another set of quarterly files with income and other characteristics for each member of the household, and a set of fifty-one annual “EXPN” files with detailed information about various categories of expenditures.

These detailed files allow NAHB to maintain a conservative approach and exclude spending on items that may often be purchased from a vendor outside the local area. For example, BLS collects information on spending while on trips and vacations away from home in a separate “ETRV” and “ETRE” file. The NAHB local impact model does not include any spending information at all from these files. NAHB processes the information from the EXPN files along with information on household characteristics and income to estimate spending tendencies on 52 locally produced commodities, as shown in the following table:

Local Spending Extracted from the CE EXPN Files

	Local commodity	IO Code	CE File	Description of items included in local spending
01	Greenhouse, nursery, and floriculture production	111400	ECRB	Costs of all items and services for planting shrubs or trees, or otherwise landscaping the ground of the housing unit in which the consumer unit lives.
02	Electric power generation, transmission, and distribution	221100	EUTC	Electricity bills for the housing unit in which the consumer unit lives, including if combined with natural gas and/or water, sewerage. This is also the default category for generally combined expenses with particular utility not specified.
03	Natural gas distribution	221200	EUTC	Gas bills for the housing unit in which the consumer unit lives.
04	Water, sewage and other systems	221300	EUTC	Water and/or sewage bills, including water combined with trash collection, for the housing unit in which the consumer unit lives.
05	Residential maintenance and repairs	230302	ECRB	Costs of all items and services associated with building or repairing an addition to the house or a new structure including porch, garage or new wing; finishing a basement or an attic or enclosing a porch; remodeling one or more rooms; building outdoor patios, walks, fences, or other enclosures, driveways, or permanent swimming pools, inside painting or papering; outside painting; plastering or paneling; plumbing or water heating installations and repairs; electrical work; heating or air-conditioning jobs; flooring repair or replacement; insulation; roofing, gutters, or downspouts; siding; installation, repair, or replacement of window panes, screens, storm doors, awnings, etc.; and masonry, brick or stucco work; or other improvements or repairs for the housing unit in which the consumer unit lives.
For the four categories of retail trade, only gross margins rather than total spending is put into the model. Gross margins are applied industry by industry. A single factor is used to reduce the amount to account for loss of business to local retailers to E-commerce and mail order business. The source is the most recent data in the Census Bureau’s 2012 Annual Retail Trade Report, released in 2014,				
06	Motor vehicle and parts dealers	441000	EOVB	Purchases of automobiles, including down payment and payment of principle on loans × 17.6% (gross margin for automobile dealers).
07	Food and beverage stores	445000	ETRF	Cost of food or beverages at grocery, convenient or liquor stores during local overnight stays x 27.9% (gross margin for food and beverage stores).

	Local commodity	NAICS Code	EXPN File	Description of items included in local spending
07	Food and beverage stores (cont.)	445000	EXPA	Expenditure for food, non-alcoholic beverages and nonfood items at grocery stores, food and non-alcoholic beverages from places other than grocery stores, and all alcohol to be served at the home × 27.9% (gross margin for food and beverage stores).
08	General merchandise stores	452000	EAPA	50 percent of major appliance purchases (assuming other 50 percent purchased from other retail) x 26.3% (gross margin for general merchandise stores), adjusted for losses to E-commerce and mail order business.
			EAPB	50 percent of purchases of other households appliances and other selected items (assuming other 50 percent purchased from other retail) x 26.3% (gross margin for general merchandise stores), adjusted for losses to E-commerce and mail order business.
			EFRA	50% of purchases of home furnishings (assuming other 50 percent purchased from other retail) x 32.1% (gross margin for department stores), adjusted for losses to E-commerce and mail order business
			ECLA	50% of purchases of clothing and accessories (assuming other 50 percent purchased from other retail) x 32.1% (gross margin for department stores), adjusted for losses to E-commerce and mail order business.
			EENT	50% of purchases of CDs or audio tapes, photographic film, video cassettes or tapes or discs, and books, but not through a mail order club or subscription x 32.1% (gross margin for department stores), adjusted for losses to E-commerce and mail order business.
09	Other retail	4A0000	EUTC	Bills for fuel oil, bottle or tank gas, or fuels not specifically identified, for the home in which the consumer unit lives x 37.8% (gross margin for nonstore retailers).
			ECRA	Purchase of building materials and supplies, either for or not for a specific project x 34.7% (gross margin for building materials and supplies dealers).
			EAPA	50 percent of major appliance purchases (assuming other 50 percent purchased from general merchandise stores) × 28.2% (gross margin for electronics and appliance stores), adjusted for losses to E-commerce and mail order business.
			EAPB	50 percent of purchases of other households appliances and other selected items (assuming other 50 percent purchased from general merchandise stores) × 28.2% (gross margin for electronics and appliance stores), adjusted for losses to E-commerce and mail order business.
			EFRA	50% of purchases of home furnishings (assuming other 50 percent purchased from general merchandise stores) × 46.6% (gross margin for furniture and home furnishing stores), adjusted for losses to E-commerce and mail order business.
			ECLA	50% of purchases of clothing and accessories (assuming other 50 percent purchased from general merchandise stores) × 45.8% (gross margin for clothing and clothing accessories stores), adjusted for losses to E-commerce and mail order business.
			EVOT	Purchases of gasoline and other fuels and fluids used in vehicles × 10.8% (gross margin for gasoline stations)
			EIHB	Share of health insurance premiums, after broker/agent share is subtracted, used to purchase prescription drugs and durable medical equipment × 30.0% (gross margin for health and personal care stores), adjusted for losses to E-commerce and mail order business.
			EIHC	Number of persons covered by Medicare if in a senior household x Medicare expenditure per enrollee x the share of Medicare expenditures used to pay for prescription drugs, other nondurable medical products, and durable medical equipment × 30.0% (gross margin for health and personal care stores), adjusted for losses to E-commerce and mail order business.

	Local commodity	NAICS Code	EXPN File	Description of items included in local spending
09	Other retail (cont)	4A0000	EMDB	Direct purchases of glasses, hearing aids, prescription medication, convalescent equipment, or other medical equipment × 30.0% (gross margin for health and personal care stores), adjusted for losses to E-commerce and mail order business.
			EEDA	Purchases of books or other equipment for elementary or high school for members of the consumer unit × 41.6% (gross margin for sporting goods, hobby, book and music stores), adjusted for losses to E-commerce and mail order business.
			EENT	50% of purchases of CDs or audio tapes, photographic film, video cassettes or tapes or discs, and books, but not through a mail order club or subscription (assuming other 50 percent purchased from general merchandise stores) × 41.6% (gross margin for sporting goods, hobby, book and music stores), adjusted for losses to E-commerce and mail order business.
			EMIS	Expenses for flowers, potted plants, pet supplies and medicines, toys, and games, and hobbies, including if combined with computer software for games × 45.4% (gross margin for miscellaneous store retailer), and adjusted for losses to E-commerce and mail order business.
			EXPB	Expenditures for cigarettes and other tobacco products × 29.4% (gross margin for all retailers excluding motor vehicle and parts dealers), adjusted for losses to E-commerce and mail order business.
10	Transit and ground passenger transportation	485000	EXPB	Costs for taxis, limousine service, and public transportation, except while on a trip.
11	Newspaper publishers	511110	EENT	Expenses for newspapers and other periodicals not through a subscription.
12	Wired telecom-munications carriers	517110	EUTA	Bills from telecommunications companies for residential service, internet access, non-telephone rental and purchases, and 71.2% of bills for cable or satellite television service (financial data compiled ions Multimedia Research Group, Inc indicates that satellite had a 28.8% share of the combined cable/satellite market).
			EUTP	Pre-paid phone card or public pay phone services.
			EUTI	Bills from internet service providers for internet connection and service (excluding those away from home), miscellaneous combined expenses, and 71.2% of bills for cable or satellite television service.
13	Wireless tele-communications carriers (except satellite)	517210	EUTA	Bills for mobile/cellular telephone service.
			EUTP	Pre-paid cellular minutes.
14	Satellite, telecommunications resellers, and all other tele-communications	517A00	EUTA	28.8% of the bills from telecommunications for cable or satellite television service, plus bills for Voice over IP service.
			EUTI	Bills from internet service providers for satellite radio, plus 28.8% of the bills for cable or satellite television service.
15	Data processing, hosting, and related services	518200	EUTA	Bills paid to providers of applications, games or ringtones.
16	Monetary authorities and depository credit intermediation	52A000	EHEL	Interest paid on lump sum home equity loans, based only on the home in which the consumer unit lives.

	Local commodity	NAICS Code	EXPN File	Description of items included in local spending
16	Monetary authorities and depository credit intermediation (cont)	52A000	EOPH	Interest paid on home equity lines of credit, based only on the home in which the consumer unit lives.
			EXPB	Charges for safe deposit boxes, checking accounts, and other banking services.
17	Nondepository credit intermediation and related activities	522A00	EOVB	Interest payment on automobile loans.
18	Insurance agencies, brokerages, and other insurance related activities	524200	EINB	Percent of premiums for all types of insurance other than health (percentage based on agent/brokers' share of industry).
			EIHB	Percent of premiums for health insurance (percentage based on agent/brokers' share of industry).
19	Real estate	531000	RNT	Total rental payments for the housing unit in which the consumer unit lives.
			OPI	Ground or land rent, regular HOA fees, special payments for property management services—for the property in which the consumer unit lives.
20	Automotive equipment rental and leasing	532100	ERTV	Expenses for renting vehicles, except if rented while on a vacation.
			ELSD	Expenses for leasing vehicles.
21	Consumer goods and general rental centers	532A00	EAPA	Expenses for renting major appliances.
			EAPB	Expenses for renting other household appliances and selected items.
			EFRB	Expenses for renting furniture.
			ECLD	Expenses for renting clothing.
			EMDB	Expenses for renting convalescent or other medical equipment.
			EENT	Amount paid for rental of Blu-ray Discs, DVDs, or VHS tapes.
22	Legal services	541100	EMIS	Expenses for services of lawyers or other legal professionals.
23	Accounting, tax preparation, bookkeeping, and payroll services	541200	EMIS	Accounting fees.
24	Photographic services	541920	EENT	Amount paid for film processing or printing digital photographs.
			EMIS	Amount paid for professional photography fees.
25	Veterinary services	541940	EMIS	Veterinarian expenses, including if combined with other pet services.
26	Investigation and security services	561600	EMIS	Home security service fees.
27	Services to buildings and dwellings	561700	EAPA	Charges for installing major appliances.

	Local commodity	NAICS Code	EXPN File	Description of items included in local spending
27	Services to buildings and dwellings (cont.)	561700	EEQB	Costs for pest control or repairing and servicing heating and air conditioning equipment.
			EMIS	Gardening or lawn care, housekeeping, or other home services and small repair jobs around the house.
28	Waste manage-ment and remed-iation services	562000	EUTC	Trash/garbage collection bills, including if combined with sewerage, and septic tank cleaning services, for the housing unit in which the consumer unit lives.
29	Elementary and secondary schools	611100	EEDA	Tuition and other expenses for elementary or high school for members of the consumer unit.
30	Offices of physicians	621A00	EIHB	Share of health insurance premiums, after broker/agent share is subtracted, used to pay for physician and clinical services.
			EIHC	Number of persons covered by Medicare if in a senior household x Medicare expenditure per enrollee x the share of Medicare expenditures used to pay for physician and clinical services.
			EMDB	Direct payments for eye care or physician services.
31	Offices of dentists	621200	EIHB	Share of health insurance premiums, after broker/agent share is subtracted, used to pay for dental services.
			EIHC	Number of persons covered by Medicare if in a senior household x Medicare expenditure per enrollee x the share of Medicare expenditures used to pay for dental services.
			EMDB	Direct payments for dental care
32	Offices of other health practitioners	621B00	EIHB	Share of health insurance premiums, after broker/agent share is subtracted, used to pay for other professional services.
			IHC	Number of persons covered by Medicare if in a senior household x Medicare expenditure per enrollee x the share of Medicare expenditures used to pay for other professional services.
			EMDB	Direct payments for services by medical professionals other than physicians, lab tests, and other medical care.
33	Home health care services	621600	EIHB	Share of health insurance premiums, after broker/agent share is subtracted, used to pay for home health care.
			EIHC	Number of persons covered by Medicare if in a senior household x Medicare expenditure per enrollee x the share of Medicare expenditures used to pay for home health care.
34	Hospitals	622000	EIHB	Share of health insurance premiums, after broker/agent share is subtracted, used to pay for hospital care.
			EIHC	Number of persons covered by Medicare if in a senior household x Medicare expenditure per enrollee x the share of Medicare expenditures used to pay for hospital care.
			EMDB	Direct payments for hospital rooms or services.
35	Nursing and residential care facilities	623000	EIHB	Share of health insurance premiums, after broker/agent share is subtracted, used to pay for nursing home care.
			EIHC	Number of persons covered by Medicare if in a senior household x Medicare expenditure per enrollee x the share of Medicare expenditures used to pay for nursing home care.
			EMDB	Direct payments for care in convalescent of nursing home.
36	Child day care services	624400	EEDA	Expenses for nursery school or child day care centers for members of the consumer unit.

	Local commodity	NAICS Code	EXPN File	Description of items included in local spending
36	Child day care services	624400	EMIS	Expenses for babysitting, nanny services, or child care in the consumer unit's or someone else's home.
37	Performing arts companies	711100	ESUB	Theater or concert season tickets.
			EENT	Single admissions to movies, theaters, and concerts.
38	Spectator sports	711200	ESUB	Season tickets to sporting events.
			EENT	Single admissions to spectator sporting events.
39	Gambling industries (except casino hotels)	713200	EMIS	Expenses for lotteries and games of chance.
40	Other amusement and recreation industries	713900	EEDA	Recreational lessons and instruction for members of the consumer unit.
			ESUB	Expenses for membership in golf courses. Country clubs, health clubs, fitness centers, or other sports and recreational organizations.
			EENT	Fees for participating in sports.
			ETRF	Amount paid for entertainment or admissions during local overnight stays
41	Full-service restaurants	722110	ETRF	50% of cost of meals, snacks, or beverages at restaurants, bars or fast food places during local overnight stays.
			EXPA	50% of expenditures for food and beverages at restaurants, cafeterias, cafes, drive-ins, etc. or t school for or pre-school for school-age children.
42	Limited-service restaurants	722211	ETRF	50% of cost of meals, snacks, or beverages at restaurants, bars or fast food places during local overnight stays.
			EXPA	50% of expenditures for food and beverages at restaurants, cafeterias, cafes, drive-ins, etc. or t school for or pre-school for school-age children.
43	All other food and drinking places	722A00	EMIS	Food and beverage for catered affairs.
44	Automotive repair and maintenance, except car washes	8111A0	EVEQ	Expenses for vehicle maintenance and repair.
			EVOT	Expenses for towing and automobile repair service policies.
45	Electronic and precision equipment repair and maintenance4	811200	EEQB	Cost for repairs and services to AV equipment (except if installed in a vehicle) and to computers and related equipment.
46	Personal and household goods repair and maintenance	811400	EEQB	Costs for repairing or servicing miscellaneous items such as appliances, tools, photographic, sports, and lawn and garden equipment.
			EFRB	Costs for repairing furniture.
			ECLD	Costs for repairing or altering clothing and accessories, or repairing watches or jewelry.
47	Personal care services	812100	EIHB	Share of health insurance premiums, after broker/agent share is subtracted, used to pay for other health, residential and personal care services.
			EIHC	Number of persons covered by Medicare if in a senior household x Medicare expenditure per enrollee x the share of Medicare expenditures for other health, residential and personal care services.

	Local commodity	NAICS Code	EXPN File	Description of items included in local spending
48	Death care services	812200	EMIS	Expenses for funerals, burials, cremation, and purchase and upkeep of cemetery lots or vaults.
49	Dry cleaning and laundry services	812300	EXPB	Expenses for clothing and other items at sent to drycleaners and laundry, as well as coin operated dry cleaning and laundry machines.
50	Other personal services	812900	ECLD	Costs of clothing storage services.
			EVOT	Fess for vehicle parking, boat docking and plane landing.
			EMIS	Pet services.
			EXPB	Expenses for haircuts, hair styling, manicures, massages, and other salon services.
51	Religious organizations	813100	ECNT	Contributions to religious organizations.
52	Civic, social, professional and similar organizations	813B00	ESUB	Expenses for membership in civic, service, or fraternal organizations.

There is somewhat more detail in a few input-output industries than is available in a spending line from the CE files. For example, the CE files do not distinguish spending in limited service eating places from spending in full service restaurants. According to the 2007 Economic Census, total sales in each category was $182 to $192 billion—close to a 50-50 split. Therefore, half of spending in eating places is allocated to full service restaurants; the other half to the limited service places. Similarly, the CE files don't distinguish items purchased in general merchandise stores from those purchased in more specialized retail outlets. For goods that likely could be purchased in either, again a 50-50 split is used, as shown for local commodities 08 and 09 in the table above.

For all items included under any retail sales category, only the gross margins are included, and in most cases a further adjustment is made to account for loss of local sales to E-commerce and mail order business. These adjustments are based on information in the Census Bureau's Annual Retail Trade Report for 2012. The report includes a table on gross margins by 6-digit NAICS code that can be used directly. The report also contains separate tables on total sales and mail order & E-commerce. An adjustment factor is calculated based on total E-commerce & mail order sales as a fraction of total retail sales, excluding food and beverage service and motor vehicle and parts dealers. For 2012, the adjustment factor is 1-322,543/4,344,140. In the above table, "adjusted for E-commerce and mail order loss" means that particular category of retail spending is multiplied by this factor.

Insurance payments are separated into a share going to brokers and agents and the insurance companies, based on the proportional share of revenue reported in the latest Economic Census. The share going to brokers and agents is counted as local income. However, it is also assumed that the share going to insurance companies comes back in some cases as these companies pay medical costs for policy holders that go to health care providers in the local area. This is estimated using "Personal Health Care Expenditures by object & Source of Payment" reported by the Census Bureau in the Table 138 of the 2012 Statistical Abstract of the United States. A similar calculation is made for expenses covered by Medicare. The CE data include the number of household members covered by Medicare. Payments made by Medicare to local health care providers are estimated using statistics on Medicare Enrollees from Table 146 of the 2012 Statistical Abstract, combined with the health care expenditure information from Table 138.

The consumer spending variables used in the model are all in the form of average propensities to consume—that is, average fractions of before-tax income spent on various items. As shown in the table above, The EXPN files generate consumer spending estimates for 52 locally produced commodities. In addition, seven categories of local commodities produced by local government enterprises are appended to the list:

1 Local government electric service
2 Local government natural gas distribution
3 Local government water & sewerage
4 Local government passenger transit
5 Local government liquor stores
6 Local government sanitary services
7 Local government hospitals

Although these seven extra commodities do not increase local spending in total, they allow the model to allocate consumption between the publicly produced and privately produced commodities based on information from the Census of Governments. In this sense, the model is consistent with both national household consumption patterns and revenue collected by all government enterprises in a particular local area.

To this is added one other local commodity, general government, to account for tax and fee payments (computed in Phase II primarily from BEA personal income estimates and Census of Governments revenue data).

The results can be collected in the 2×60 matrix, $\boldsymbol{A}$:

$$\boldsymbol{A} = \begin{bmatrix} a_1 & a_2 & a_3 & \cdots & a_{59} & 0 \\ 0 & 0 & 0 & \ldots & 0 & 1 \end{bmatrix}$$

The elements in the first row of $\boldsymbol{A}$ show the average fraction of income spent on each of the 59 local commodities (including those produced by local government enterprises such as publicly owned utilities or hospitals). The "O"s and "1" in the second row indicates that no taxes are spent directly by the household on any of the first 59 commodities; 100 percent is spent on the local general government commodity. This two-row structure is designed to align with the output from Phase I of the model, which comes in the form of before-tax local income and local tax estimates.

Several other matrices and vectors derived from the above concepts are needed to calculate the Phase II ripple or multiplier effect:

$\boldsymbol{W}$: a 60×99 matrix that translates local commodities into local income,

$\boldsymbol{G}$: a 60×99 matrix that translates local commodities into local government general revenue collected from persons, and

$\boldsymbol{T}$: a 60×99 matrix that translates local commodities into local government general revenue collected from businesses

$\boldsymbol{L} = [\boldsymbol{W} \quad \boldsymbol{G} \quad \boldsymbol{T}]$ therefore defines a 60×297 matrix

$\boldsymbol{x}$ = a two element column vector containing local income and local taxes generated in Phase I

$$\boldsymbol{Y} = \begin{bmatrix} \boldsymbol{i} & \boldsymbol{0} & \boldsymbol{0} \\ \boldsymbol{0} & \boldsymbol{i} & \boldsymbol{0} \\ \boldsymbol{0} & \boldsymbol{0} & \boldsymbol{i} \end{bmatrix}$$ a 297×3 matrix where $\boldsymbol{i}$ is a 99-element unit column vector,

$$\boldsymbol{Z} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 0 & 1 \end{bmatrix}$$

In summary, $\boldsymbol{x}$ is the income and tax output from Phase 1, $\boldsymbol{A}$ translates income and taxes into spending on particular commodities, $\boldsymbol{L}$ translates the detailed commodity spending into income and taxes in each of 99 local industries, and $\boldsymbol{Y}$ and $\boldsymbol{Z}$ are technical devices for summing results. $\boldsymbol{Y}$ collapses the components of a 297-element vector into a 3-element vector of income, personal taxes, and business taxes. $\boldsymbol{Z}$ converts a 3-element vector of this form into a 2-element income and tax vector.

The row vector defined as $\boldsymbol{x}'\boldsymbol{A}$ shows how much, in dollar terms, people who earn income during Phase I spend on each of the 60 local commodities (including local government employees, whose paychecks are supported by taxes and charges for particular government-run enterprises).

The calculation $\boldsymbol{x}'\boldsymbol{ALYZ}$ produces a 2-element local income and local tax vector of the same form as $\boldsymbol{x}'$. Postmultiplying a vector of this type by $\boldsymbol{ALYZ}$ will always produce a similar, 2-element income and tax vector. Either by construction, or by checking that both eigenvalues are smaller than 1, it is possible to show that $\boldsymbol{ALYZ}$ is a contracting matrix. This implies that the rounds below show successively smaller increments of income and taxes added to the local economy:

$$\begin{aligned} &Round\ 0: \boldsymbol{x}' \\ &Round\ 1: \boldsymbol{x}'\ \boldsymbol{ALYZ} \\ &Round\ 2: \boldsymbol{x}'\ \boldsymbol{ALYZ}\ \boldsymbol{ALYZ} \\ &Round\ 3: \boldsymbol{x}'\ \boldsymbol{ALYZ}\ \boldsymbol{ALYZ}\ \boldsymbol{ALYZ} \\ &\qquad\vdots \\ &Round\ K: \boldsymbol{x}' \prod_{k=1}^{K} \boldsymbol{ALYZ} \end{aligned}$$

The terms of this sequence can be summed in the usual manner to create an infinite series. Because $\boldsymbol{ALYZ}$ is a contracting matrix, the result is a convergent series, the limit of which is

$$\boldsymbol{x}' \, [\boldsymbol{I} - \boldsymbol{ALYZ}]^{-1}$$

This is the final multiplied effect on local income and local taxes at the end of Phase II. The factor $[\boldsymbol{I}\text{-}\boldsymbol{ALYZ}]^{-1}$ is a matrix version of the conventional Keynesian spending multiplier. Because $\boldsymbol{x}'$ is reported in Phase I, it is subtracted from the effect reported in Phase II.

For some purposes, especially estimating employment impacts, we are interested in tracking income in Phase II by industry. Calculations to accomplish this are based on the following sequence of 1×297 vectors:

$$\begin{aligned}
&Round\ \ 1: \ \boldsymbol{x'AL} \\
&Round\ \ 2: \ \boldsymbol{x'ALYZAL} \\
&\quad\quad\quad\ \ \vdots \\
&Round\ \ K: \ \boldsymbol{x'AL} \prod_{k=1}^{K-1} \boldsymbol{YZAL}
\end{aligned}$$

Note that sequence begins with the spending vector $\boldsymbol{x'AL}$—that is, it excludes the income and taxes that have already been captured in Phase I. The limit of the series defined based on this sequence is

$$\boldsymbol{x'AL}[\boldsymbol{I} - \boldsymbol{YZAL}]^{-1}$$

This is a 297-element row vector, the first 89 elements containing the final, multiplied effect on local income by industry generated during Phase II. As explained above, income by industry can be separated into business owners' income and wages and salaries, and the wages and salaries converted to full-time job equivalents.

From the standpoint of local governments, it may be desirable to track individual sources of revenue, such as particular fees and taxes. To facilitate this, it is useful to have a three element local income and local tax vector, where the tax revenue is decomposed into taxes collected from persons and taxes collected from businesses.

Consider the following sequence of such 3-element vectors:

$$\begin{aligned}
&Round\ \ 1: \ \boldsymbol{x'ALY} \\
&Round\ \ 2: \ \boldsymbol{x'ALY\ ZALY} \\
&\quad\quad\quad\ \ \vdots \\
&Round\ \ K: \ \boldsymbol{x'ALY} \prod_{k=1}^{K} \boldsymbol{ZALY}
\end{aligned}$$

This sequence begins after *Round 0*, implicitly excluding income earned and taxes paid during Phase I. The limit of the infinite series defined by this sequence is

$$x'ALY\,[I - ZALY\,]^{-1}$$

This is the final, multiplied effect on local income, local government revenue collected from persons, and local government revenue collected from businesses in Phase II of the model. The tax structure for a particular local area, derived primarily from Census of Governments data as described above, can be applied to this result in order to decompose local government revenue into particular types of taxes and fees.

Phase III: Ongoing Impacts

Another distinctive feature of the NAHB model is the way it uses CE and other data to model the average behavior of occupants that differs based on the type of housing being built. At present, there are six basic variants of the NAHB model designed to handle the following types of construction:

1. Generic Single-Family
2. Generic Multifamily
3. Active Adult
4. Family Low-Income Housing Tax Credit (LIHTC)
5. Elderly LIHTC
6. Remodeling

The remodeling version of the model does not in general incorporate ongoing impacts, so it requires no occupant income estimates. For the other five versions of the model, separate occupant income estimates are derived in a way that vary with location as well as with the type of units being built. The derivations are based on relationships between average income and standard variables that are typically available at the local level. The methods for establishing these relationships are summarized below.

Generic Single-Family. Regression of average income of home owners on area median family income and average value of the units using American Community Survey (ACS) microdata.

Generic Multifamily. Regression of average income of home owners on area median family income and average rent using ACS microdata.

Active Adult. Average income of movers into age-restricted owner occupied units and average income of all home buyers are computed from American Housing Survey (AHS) microdata, and the ratio of the two averages is used to adjust home buyers' income for the active adult case.

Family LIHTC. Average incomes of all movers into rental units who have less than 60 percent of median family income for the U.S. as a whole, computed from CE data.

Elderly LIHTC. Average incomes of all elderly movers into rental units who have less than 60 percent of median family income for the U.S. as a whole, computed from CE data.

The ACS is the Census Bureau's replacement for the long form questionnaire that until 2000 was used to collect information on income and structure type in the decennial Census. The AHS, funded by the U.S. Department of Housing and Urban Development (HUD) and conducted by the Census Bureau, is the federal government's primary vehicle for collecting detailed information about housing units and their occupants at the national level.

The ratios and regression results listed above allow the model to be simultaneously customized to a particular area and a particular type of construction by inputting specific local information that is generally available. When customizing to a local area, median family income for that particular area is used. HUD produces median income estimates for all parts of the country in a timely fashion as part of the process it uses to establish income limits for various housing programs.

When it is necessary to translate rents into value or vice versa, the median cap rate from the Rental Housing Finance Survey (RHFS), also funded by HUD and conducted by the Census Bureau, is used.

In addition to average income, estimated spending tendencies for movers into each type of construction are needed. Separate spending vectors are estimated for each using household information available in the CE data. The table on the following page shows average local propensities to consume computed from the 2012 CE.

This modeling of average spending by different types of households soon after they move in is another distinguishing feature of the NAHB local impact model. In addition to the function they serve in the local model, average spending tendencies computed from CE data have also proven to be of interest for their implications at the national level.[8]

Compared to home buyers, renters tend to spend more of their incomes locally—partly due to the tendency of lower-income households to spend a greater fraction of their incomes on necessities, but also due to rental payments that go to a local owner, or owner employing a management company with a local presence. The equivalent housing expense for a home buyer would be a mortgage payment. Because mortgage payments typically are made to non-local owners of the mortgage through non-local servicers, they are excluded from the spending estimates in the NAHB local impact model.

Average propensities to spend on virtually all categories of local health care services are higher for households moving into construction designed for older residents (age-restricted active adult and elderly LIHTC).

As was described in Phase II, seven categories of commodities produced by local government enterprises are added to the model, and a share of local spending (which may be zero) is allocated to these enterprises instead of private producers based on revenues reported in the Census of Governments for each local government enterprises in the area.

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[8] See, for example, the December 2008 Special Study "Spending Patterns of Home Buyers," written by Natalia Siniavskaia and published by NAHB in Housing Economics.com.

Average Local Spending Computed from CE Data

	Output of industry purchased locally	All House-holds	New Home Buyers	New Multifamily Renters	Active Adult Buyers	New Family LIHTC	New Elderly LIHTC
1	Greenhouse, nursery, and floriculture production	0.129%	0.172%	0.000%	0.176%	0.000%	0.000%
2	Electric power generation, transmission, and distr.	2.689%	2.410%	0.002%	3.428%	0.000%	0.000%
3	Natural gas distribution	0.674%	0.499%	0.000%	0.723%	0.000%	0.000%
4	Water, sewage and other systems	0.793%	0.802%	0.000%	1.108%	0.000%	0.000%
5	Residential maintenance and repair	3.059%	2.087%	0.000%	3.567%	0.170%	0.072%
6	Motor vehicle and parts dealers	1.218%	1.439%	5.098%	1.447%	1.408%	1.190%
7	Food and beverage stores	4.829%	3.303%	4.446%	3.567%	8.573%	8.793%
8	General merchandise stores	0.745%	0.840%	1.271%	0.723%	1.129%	0.437%
9	Other retail	3.119%	2.494%	3.088%	2.906%	3.896%	4.069%
10	Transit and ground passenger transportation	0.190%	0.030%	0.269%	0.028%	0.990%	0.990%
11	Newspaper publishers	0.027%	0.016%	0.042%	0.042%	0.057%	0.096%
12	Wired telecommunications carriers	2.392%	1.770%	1.878%	2.588%	2.868%	4.441%
13	Wireless telecom. carriers (except satellite)	2.081%	1.809%	3.565%	1.811%	3.323%	2.435%
14	Satellite, telecom. Resellers & all other telecom.	0.323%	0.249%	0.620%	0.335%	0.472%	0.494%
15	Data processing, hosting, and related services	0.003%	0.002%	0.000%	0.002%	0.006%	0.000%
16	Monetary authorities, depository credit intermediation	0.437%	0.298%	0.000%	0.366%	0.000%	0.000%
17	Nondepository credit intermediation+related activities	0.417%	0.616%	0.906%	0.463%	0.381%	0.327%
18	Insurance agencies, brokerages, and related activities	0.407%	0.387%	0.722%	0.462%	0.291%	0.288%
19	Real estate	8.301%	2.048%	27.078%	1.292%	33.130%	34.324%
20	Automotive equipment rental and leasing	0.795%	0.775%	0.000%	0.348%	0.426%	0.000%
21	Consumer goods and general rental centers	0.070%	0.055%	0.041%	0.046%	0.104%	0.030%
22	Legal services	0.335%	1.185%	0.006%	0.163%	0.852%	0.055%
23	Accounting, tax preparation, bookkeeping, and payroll	2.512%	1.939%	0.250%	1.691%	4.895%	0.904%
24	Photographic services	0.045%	0.039%	0.257%	0.017%	0.054%	0.015%
25	Veterinary services	0.236%	0.199%	0.006%	0.209%	0.149%	0.104%
26	Investigation and security services	0.024%	0.042%	0.055%	0.066%	0.009%	0.015%
27	Services to buildings and dwellings	0.385%	0.389%	0.093%	0.666%	0.181%	0.119%
28	Waste management and remediation services	0.219%	0.217%	0.000%	0.283%	0.000%	0.000%
29	Elementary and secondary schools	0.212%	0.314%	0.000%	0.134%	0.060%	0.022%
30	Offices of physicians	4.361%	2.732%	3.879%	5.881%	3.595%	10.321%
31	Offices of dentists	0.787%	0.693%	0.416%	1.036%	0.698%	1.082%
32	Offices of other health practitioners	0.670%	0.387%	0.280%	0.812%	0.453%	1.269%
33	Home health care services	0.884%	0.395%	0.625%	1.123%	0.755%	2.585%
34	Hospitals	3.761%	2.482%	5.133%	5.953%	2.682%	9.324%
35	Nursing and community care facilities	0.974%	0.386%	0.592%	1.140%	0.791%	2.808%
36	Child day care services	0.202%	0.345%	0.632%	0.013%	0.183%	0.000%
37	Performing arts companies	0.191%	0.235%	0.353%	0.403%	0.279%	0.062%
38	Spectator sports	0.070%	0.071%	0.109%	0.020%	0.156%	0.007%
39	Gambling industries (except casino hotels)	0.068%	0.036%	0.005%	0.083%	0.128%	0.351%
40	Other amusement and recreation industries	0.335%	0.490%	1.146%	0.416%	0.350%	0.058%
41	Full-service restaurants	2.415%	1.902%	3.289%	2.020%	4.756%	2.625%
42	Limited-service restaurants	2.415%	1.902%	3.289%	2.020%	4.756%	2.625%
43	All other food and drinking places	0.107%	0.699%	0.007%	2.638%	0.034%	0.008%
44	Automotive repair and maintenance	1.713%	1.289%	2.595%	1.961%	1.799%	1.746%
45	Electronic and precision equip. repair & maintenance	0.022%	0.019%	0.000%	0.031%	0.012%	0.005%
46	Personal and household goods repair & maintenance	0.105%	0.078%	0.027%	0.131%	0.084%	0.154%
47	Personal care services	0.144%	0.070%	0.107%	0.183%	0.121%	0.403%
48	Death care services	0.278%	0.067%	0.029%	0.163%	0.524%	0.259%
49	Dry-cleaning and laundry services	0.264%	0.103%	0.225%	0.116%	0.886%	0.752%
50	Other personal services	0.745%	0.707%	0.678%	0.859%	1.163%	0.988%
51	Religious organizations	0.746%	0.821%	0.746%	1.205%	0.337%	0.415%
52	Civic, social, professional, and similar organizations	0.011%	0.005%	0.000%	0.009%	0.000%	0.002%

Also as described in Phase II, Census of Governments data are used to estimate most categories of tax and fee revenue generated for general (non-enterprise) governments in the area. The exemption is residential property taxes. Perhaps surprisingly, residential and non-residential property taxes are not reported separately. Moreover, some states have restrictions on rate increases, or other laws that tend to make property tax rates different on new construction. Particular developments (for example, those financed by the LIHTC program) may also be granted special forms of property tax relief.

For these reasons, when customizing the local impact model to a specific area, information about property taxes on the units being built must be supplied by the entity requesting the analysis. Phase III of the model counts only property tax on the value of construction. Unless specific information is provided for an individual project or jurisdiction, this is calculated assuming that the raw land would be taxed at the same rate if not developed. Any residential property tax from existing units is treated as unrelated to the new homes being analyzed and excluded from the government revenue impact estimates.

Non-residential property taxes are treated much like other categories of government revenue, except that the aggregate for a jurisdiction to be estimated from a larger aggregate in the government data that does not distinguish residential from non-residential. This is accomplished by subtracting an estimated 53.37 percent from total property taxes to account for residential share of property taxes. The estimate is calculated as follows, from data available for 2012 in the ACS, RHFS and the Census Bureau's Summary of State and Local Government Tax Revenue (SSLGTR):

Aggregate real estate taxes paid by homeowners:	$206.04 billion (ACS)
Estimate for homeowners not reporting:	5.93 billion
Estimated real estate taxes paid on rental housing	41.85 billion (ACS and RHFS)
Total residential real estate taxes	$253.82 billion
Total property taxes	$475.83 billion (SSLGTR)
Residential share	53.37%

The estimate for homeowners not reporting in the ACS is based on the number of non-reporters multiplied by median tax payment for those who do report. The estimate for rental units is based on the number of rental units in the ACS multiplied by median tax per rental unit in the RHFS.

Multifamily Phase III impacts are reduced to account for vacant units. By default, the single-family version of the model assumes that units are intended for owner-occupancy and have negligible vacancies. In the Census Bureau's Housing Vacancy Survey homeowner vacancy rates are usually in the neighborhood of only one percent.

For multifamily units, the average multifamily rental annual vacancy rate over the prior decade and average annual multifamily homeowner vacancy rate over the prior decade are used, depending on whether the units are condominiums or rental apartments. In other respects, Phase III treats condo buyers the same as single-family home buyers (the income and spending tendencies discussed above being based on buyers of owner-occupied housing units, irrespective of structure type).

Although vacancy rates are known to fluctuate, the model estimates annual ongoing impacts that are expected to persist for an extended period, so a long-term "natural" measure of vacancy rates is more appropriate for Phase III than a very current, possibly anomalous, number. The reduction for vacancies is applied to all Phase III multifamily impacts except for property taxes, which are assumed to be paid by the owner of the property, whether the units are occupied or not.

Local spending and taxes (including fees and charges paid to local government entities) generate income for local residents, and this income will be spent and recycled in the local economy, much as in Phase II of the model.

Let $\boldsymbol{x}_{\mathrm{n}}$ denote the initial income and tax column vector for new home occupants, $\boldsymbol{A}_{\mathrm{n}}$ denote the matrix formed from the consumption spending patterns of new home occupants, and otherwise maintain the notation used in Phase II of the model. Then consider the following sequence:

$$
\begin{aligned}
&Round\ 0:\ \boldsymbol{x}_n{}'\\
&Round\ 1:\ \boldsymbol{x}_n{}'\,\boldsymbol{A}_n\boldsymbol{LYZ}\\
&Round\ 2:\ \boldsymbol{x}_n{}'\,\boldsymbol{A}_n\boldsymbol{LYZ}\ \boldsymbol{ALYZ}\\
&Round\ 3:\ \boldsymbol{x}_n{}'\,\boldsymbol{A}_n\boldsymbol{LYZ}\ \boldsymbol{ALYZ}\ \boldsymbol{ALYZ}\\
&\qquad\qquad\vdots\\
&Round\ K:\ \boldsymbol{x}_n{}'\,\boldsymbol{A}_n\boldsymbol{LYZ}\ \prod_{k=1}^{K}\boldsymbol{ALYZ}
\end{aligned}
$$

The sum of these terms forms an infinite series that converges to the limit

$$\boldsymbol{x}_n{}'\ [\boldsymbol{I}+(\boldsymbol{A}_n-\boldsymbol{A})\boldsymbol{LYZ}][\boldsymbol{I}-\boldsymbol{ALYZ}]^{-1}$$

When results are reported for Phase III the income earned by the occupants is subtracted from the final multiplied effect, so that only income generated for occupants of housing units already existing in the area is counted.

Note that, were new home occupants to spend the same fraction of their incomes on the various local commodities as average households, $\boldsymbol{A}_{\mathrm{n}} = \boldsymbol{A}$ and the formula would simplify to

$$\boldsymbol{x}_n{}'\ [\boldsymbol{I}-\boldsymbol{ALYZ}]^{-1}$$

The formula that produces a 297-element vector, the first 99 of which contain the added income by industry, for Phase III is

$$\boldsymbol{x}_n{}'\,\boldsymbol{A}_n\boldsymbol{L}\,[\boldsymbol{I}-\boldsymbol{YZAL}]^{-1}$$

Again, the income in each industry can be disaggregated into business owners' income and wages and salaries, and the wages and salaries converted to full time jobs. These exclude any jobs filled by occupants of the new housing units.

The formula that produces a 3-element vector showing the final, multiplied effect on local income, local government general revenue from persons, and local general government revenue from business generated in Phase III is

$$x_n' A_n LY [I - ZALY]^{-1}$$

As in Phase II, the last two elements of the final 3-element vector can be disaggregated to show revenue generated by particular types of taxes, fees, and charges. The primary difference in Phase III is that the increase in residential property tax revenue (which is introduced into the model as a separate input independent of the Census of Government computations) needs to be subtracted before the decomposition procedure can be applied.

Final Notes

All of the matrix operations in the NAHB local impact model are performed using the O-Matrix package provided by Harmonic Software. The O-Matrix code used to generate Phase III impacts for single-family construction and the code used to compute a local total requirements matrix for a previous iteration of the NAHB model are published on the Harmonic Software web site as notable uses of the O-Matrix package (http://www.omatrix.com/userstories.html).

The technical documentation on the NAHB model used to estimate the local income, jobs, and taxes generated by home building was prepared by Paul Emrath, Vice President of Survey and Housing Policy Research. For questions on the technical documentation, or on NAHB's impact of home building models in general, he may be contacted in NAHB's Economics and Housing Policy Group by phone at 202-266-8449, or by email at pemrath@nahb.org.