

Analysis of the Value of Economic Development and Potential Employment Growth in the City of Davis

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Key Concepts

- ❑ Employment supported by establishments within the City of Davis (excluding the University of California campus) grew by close to 22 percent between 1998 and 2008, reaching a total of 18,249 jobs.
- ❑ Business growth and development, the key goals of economic development can be beneficial to a local community. For the City of Davis in particular, focusing on knowledge-based sectors, among others, while remaining sensitive to economic diversification can align growth and development with community values, competitive assets, and regional opportunities.
- ❑ The economic impacts associated with growing certain types of service-related and light manufacturing knowledge-based sectors in Davis demonstrate that for every 10 jobs added, the local economy could benefit from between 3 and 20 additional jobs, \$1.7 and \$10.2 million of output, \$504,000 and \$2.4 million of employee compensation, and \$180,000 and \$682,000 of state and local taxes (values in 2008 dollars).
- ❑ With projected growth ranging from approximately 20 percent to 28 percent, the City of Davis economy could grow to support a total of between 21,914 and 23,306 jobs by 2035. This reflects an annual average increase of between 136 and 187 jobs in the 2008 to 2035 time period.
- ❑ The addition of between about 3,700 and 5,100 net new jobs projected through 2035 could generate economic outcomes ranging from \$406 million to \$586 million of output, \$183 million to \$252 million of employee compensation, and \$14 million to \$19 million of revenue from state and local taxes (values in 2008 dollars).
- ❑ The commercial space required to house the new jobs projected through 2035 could demand between approximately 87 and 160 acres of land.
- ❑ Simply inserting a new 100-acre (66 net acres) business park at full buildout directly into the current economy, irrespective of growth projections, could add nearly 2,600 jobs, generating close to \$445 million of output, \$138 million of employee compensation, and \$19 million of state and local taxes (values in 2008 dollars).

Introduction

The health and performance of the City of Davis economy relies to a large extent on behavior in the broader Sacramento region economy (which includes El Dorado, Placer, Sacramento, Solano, and Yolo Counties). In 2008, 18,249 jobs were supported by the more than 2,900 public and private sector establishments within the City of Davis boundaries (excluding the University of California campus), about 1.8 percent of the region's total employment of more than 1 million (notably lower than the 2.6 percent share of the region's population). Similar to the region, the largest sectors in the Davis



economy include Retail Trade, Health Care & Social Assistance; Accommodation & Food Service; and Government. Over the past 10 years, Davis employment increased by close to 22 percent, slightly above the region's growth rate of 20 percent. Between 2008 and 2035, regional employment is forecast to grow by nearly 18 percent and if the strong historical relationships between local and regional growth hold true, Davis could continue to see significant economic growth over the next three decades. Noting this, the City of Davis commissioned the Center for Strategic Economic Research (CSER) to provide a high level analysis of potential future employment growth in the local economy and the related economic outcomes and land demand.

Value of Local Economic Development

Effective economic development programs can help create the climate that shapes the future economy by aligning resources with community values, competitive assets, and regional opportunities. At the most basic level, economic development programs focus on the interconnected goals of growth and development within the local economy. Growth, a quantitative change, in isolation can either signal an improvement or deterioration in the local economy depending on the context. For example, growth may be concentrated in low-paying jobs and, while there is economic growth, incomes on a per capita basis may fall and overall quality of life may decline. For that reason, growth must be closely aligned with the concept of development within local economic development programs. Development, a qualitative change, emphasizes improvements in welfare and quality of life, concepts which are often ignored or inconsistent with outcomes if growth is the sole focus. The broader process of economic development

occurs when growth and development are consistent. For instance, growth may bring higher-paying jobs that push up incomes or close income gaps in addition to building critical physical and social infrastructure that benefit the community and overall quality of life. Taken together, growth and development are the foundational elements of local economic development programs, which are generally organized around the objectives of creating and maintaining employment, expanding the tax base, and improving quality of life. These core objectives tend to cut across multiple business and community interests, but each program must be customized to accommodate specific trade-offs based on the local context. A classic example is the aspiration to create jobs for local residents and avoid out-migration versus the desire to curb community growth and simply benefit from economic growth in other parts of the larger region. It is important to note that accomplishing the objectives of economic development do not necessarily depend on an increase in population—the core objectives can be achieved by attracting, expanding, retaining, and creating companies that increase local welfare and are aligned with the local labor market.

Businesses are the most tangible component of a local economy. Local businesses directly generate economic benefits and also sustain additional economic activity through linked suppliers of goods and services and employee spending within the local economy. By producing goods and providing services, a typical business supports full- and part-time jobs and related compensation (e.g. salaries and benefits), creates economic output (market value of goods and services), and generates tax revenues (e.g. sales and property taxes) all within the local economy. Local businesses also create what is known as *indirect* benefits in the local economy through supplier relationships for purchases of required goods and services. For example, Company A requires office supplies that it purchases locally from Company B. Company B's response to the demand from Company A creates additional economic benefits in the form of jobs, output, and tax revenues. The workers, in turn, generate *induced* benefits through consumption activities in the local economy. Those workers commuting into the area for jobs within local businesses often spend money locally during the work day through purchases such as food and gas. Workers who live in the area typically divert a large share of their paychecks to the local economy, spending on items such as housing, groceries, and personal services. This spending activity creates demands on local companies, which then respond by creating jobs, output, and tax revenue. If indirect and induced activities occur within the local economy, instead of leaking out to surrounding areas, the economic benefits of a local business are maximized. Even with recognized retail and business-to-business sales leakages, businesses within the City of Davis still create notable direct, indirect, and induced benefits. When the local economy grows (through attraction and expansion of businesses), the dynamic response of direct, indirect, and induced activities create a wide range of economic benefits. Conversely, if the local economy contracts (through business closures, reductions, and relocations) there is also a wide-ranging response throughout the local economy as indirect and induced activities are also affected.

All local public and private sector establishments can be classified into sectors which are either base or local-serving. Each responds to different growth dynamics and produce

different levels of economic benefits. Base sectors are typically described by the following characteristics: they bring net new wealth into an economy; they generally produce goods and services for export; and they face few geographical constraints, allowing them to operate anywhere that they deem attractive (examples include manufacturing, information service, and wholesale trade firms). On the other hand, local-serving sectors normally move wealth around a local area, produce goods and services for local consumption, and are strategically located to serve a local market (residents or base sectors). Base sectors are generally active drivers of economic development while local-serving sectors typically respond to economic and demographic growth trends. Since they tend to generate much greater economic benefits (mainly due to output and compensation levels) and bring net new wealth into the community, businesses within base sectors are often viewed as high value in economic development terms. It is important to note that both base and local-serving sectors are important to a local economy (residents and businesses rely on local-serving sectors while base sectors drive economic growth) and, in order to meet the core objectives of economic development, sector diversity is essential. Moreover, a diversified economy with both base and local-serving sectors helps reduce vulnerability to a single sector or small group of sectors and expand the local economy. It is important to highlight that diversification does not diminish the benefits of focusing on niche clusters—a local economy can have multiple niches or specializations while still creating stability through other key base and local-serving sectors.

Economic restructuring has spurred a focus on the dynamics of a knowledge-driven economy and the potential for a community to present a competitive advantage in fostering and growing businesses in knowledge-based sectors, many of which can be considered base sectors. Due to the high value activities of many knowledge-based sectors, a clustering of businesses tends to support further innovation, wealth creation, and locational advantages. The City of Davis is uniquely positioned to benefit from knowledge-based economic development. The presence of the University of California, Davis, a strong local and regional workforce, proximity to the San Francisco Bay Area, and a desirable quality of life are all competitive assets for attracting and growing knowledge-based sectors. In fact, the City's Economic Development Strategic Goals 2006-2010 emphasizes growth and development in these sectors, which are consistent with the City's values and identity. Successful economic development efforts focused on knowledge-based industries typically include strategies that create a business climate and quality of life that attracts and retains companies and workers; promote the transfer of research into marketable products and services; deploy new products and services in other sectors of the economy; support entrepreneurship and start-up businesses; build certainty into the regulatory process; create linkages between companies and support organizations (e.g. capital, networking, and advocacy); and facilitate the development of appropriate facilities. Knowledge-based sectors, particularly activities like biotechnology, clean energy, and high-technology electronics, span across a number of different major industries like Professional & Business Services, Manufacturing, and Information. Each activity makes a unique contribution to a local economy based on the specific economic structure, inter-industry relationships, and employee spending patterns. The City of Davis Community Development Department selected five prototypes for

knowledge-based industries which include three service-based activities and two light manufacturing activities. These prototypes are summarized below along with estimates of the full range of annual economic impacts based on IMPLAN model calculations, a widely-used economic input-output system (values are presented in 2008 dollars). While these five prototypes represent examples of what is targeted in the Economic Development Strategic Goals, there are many more activities associated with knowledge-based sector opportunities in the City of Davis.

Scientific Research & Development Services (e.g. research and experimental development in life sciences, engineering, and physical sciences)

Accounting for local economic structure and leakages, every 10 jobs support:

- ✓ An additional 4 jobs through indirect and induced activities
- ✓ A total of \$1.7 million of output
- ✓ A total of \$680,000 in employee compensation (salaries and benefits)
- ✓ A total of \$180,000 in state and local taxes

Life Sciences & Medical Device Manufacturing (e.g. diagnostic substances, pharmaceutical preparations, and botanicals)

Accounting for local economic structure and leakages, every 10 jobs support:

- ✓ An additional 20 jobs through indirect and induced activities
- ✓ A total of \$10.2 million of output
- ✓ A total of \$2.4 million in employee compensation (salaries and benefits)
- ✓ A total of \$682,000 in state and local taxes

Clean Energy Component Manufacturing (e.g. solar cells, thin film, and fuel cells)

Accounting for local economic structure and leakages, every 10 jobs support:

- ✓ An additional 3 jobs through indirect and induced activities
- ✓ A total of \$4.2 million of output
- ✓ A total of \$916,000 in employee compensation (salaries and benefits)
- ✓ A total of \$305,000 in state and local taxes

Technical Consulting Services (e.g. environmental consulting, utilities management consulting, and agricultural consulting)

Accounting for local economic structure and leakages, every 10 jobs support:

- ✓ An additional 3 jobs through indirect and induced activities
- ✓ A total of \$1.9 million of output
- ✓ A total of \$504,000 in employee compensation (salaries and benefits)
- ✓ A total of \$198,000 in state and local taxes

Computer System Design Services (e.g. computer programming, systems integration, and processing facilities management)

Accounting for local economic structure and leakages, every 10 jobs support:

- ✓ An additional 4 jobs through indirect and induced activities
- ✓ A total of \$1.9 million of output
- ✓ A total of \$616,000 in employee compensation (salaries and benefits)
- ✓ A total of \$208,000 in state and local taxes

These impact levels can be boosted if the City is able to internalize a greater share of the indirect and induced activities.

Overall, growth and development, the key goals of economic development can be beneficial to a local community. Success in creating and maintaining employment, expanding the tax base, and improving quality of life generates a number of positive outcomes including economic stability, employment opportunities for residents, increased standard of living, positive perceptions of the business climate, productive use of property, and tax revenue for services and infrastructure. For the City of Davis in particular, focusing on knowledge-based sectors while remaining sensitive to economic diversification can align growth and development with community values, competitive assets, and regional opportunities.

Employment Growth Projections

As the larger region is expected to see employment growth close to 18 percent over the next three decades with a net gain of over 178,000 jobs, the City of Davis is presented with the opportunity to experience strong employment growth, greater than the region as it has done in the past. CSER developed two separate employment growth projection scenarios for the City of Davis economy. Scenario 1, *Business As Usual*, assumes similar employment trends, internal dynamics, and relationships between the local and regional economies will continue through 2035. Scenario 2, *Higher Targeted Growth*, accounts for different patterns in those knowledge-based activities where the City is emphasizing targeted growth—the five sector prototypes as well as other professional, scientific, and technical services. Specifically, this scenario assumes that, for the targeted knowledge-based activities, the City will capture a greater share of regional growth than in Scenario 1 (based on the demonstrated ability of these local sectors to capture regional growth) and experience the additional annualized indirect and induced effects throughout the economy resulting from the incremental growth. The two main employment scenarios are summarized in Figure 1 on the next page. Estimates for 2008 show that public and private sector establishments in the City of Davis supported over 18,000 jobs (excluding the University of California campus)—by 2035, the City of Davis could see between approximately 22,000 and 23,000 jobs based on Scenario 1 and 2 projections. Both Scenarios 1 and 2 show that the City’s largest sectors will continue to be Retail, Leisure, & Hospitality and Educational & Health Services. These two sectors are followed by the Government & Unclassified sectors in Scenario 1 and the Combined Knowledge-Based

sector (an aggregate of the five prototypes and other professional, scientific, and technical services) in Scenario 2.

FIGURE 1
SCENARIO EMPLOYMENT, 2035

<i>Sector</i>	<i>2008</i>	<i>Scenario 1: Business As Usual</i>	<i>Scenario 2: Higher Tgtd. Growth</i>
Agriculture & Natural Resources	367	335	335
Construction	397	413	413
Manufacturing	555	873	873
Wholesale, Transport., & Utilities	961	885	885
Retail, Leisure, & Hospitality	6,109	6,831	6,836
Business & Financial Svcs.	2,515	2,409	2,412
Educational & Health Svcs.	3,849	5,846	5,847
Government & Unclassified	1,196	2,547	2,547
Combined Knowledge-Based	2,300	1,775	3,157
<i>Targeted Knowledge-Based</i>	<i>1,427</i>	<i>1,389</i>	<i>2,233</i>
<i>Other Prof. Sci., & Tech. Svcs.</i>	<i>873</i>	<i>386</i>	<i>924</i>
Total	18,249	21,914	23,306

Center for Strategic Economic Research, February 2010
Data Source: CSER estimates and projections based on National Employment Time Series Database and Moody's Economy.com information

Figure 2, on the following page, shows that the Davis economy could experience growth between about 20 percent and 28 percent through 2035, reflecting a net job increase in Scenarios 1 and 2 between approximately 3,700 and 5,100 jobs. This equates to an annual average increase of between 136 and 187 jobs in the 27-year time period. Specifically, Scenario 1 demonstrates that if the local economy behaves as it has in the past, Davis could expect a net gain of 3,665 jobs between 2008 and 2035 with a corresponding growth rate of 20.1 percent. The largest absolute gains in this scenario are expected within the Educational & Health Services; Government & Unclassified; and Retail, Leisure & Hospitality sectors while the strongest rates of growth are reflected in the Government & Unclassified; Manufacturing; and Educational & Health Services sectors. Job losses are anticipated in four sectors, moderating employment growth in the other sectors of the economy.

Overall growth in the local economy could be notably more robust, however, if the City is able to continue to benefit from its competitive assets and capture a significant amount of regional growth in the knowledge-based sectors emphasized in the Economic Development Strategic Goals, as reflected in Scenario 2. This scenario shows a net increase of 5,057 jobs with a related 27.7 percent rate of growth. The greatest employment increases are projected in the Educational & Health Services; Government & Unclassified; and Combined Knowledge-Based sectors (a notable difference from Scenario 1) with the highest growth rates concentrated in the same sectors as Scenario 1. With strong growth projected in the Combined Knowledge-Based sector, Scenario 2 employment losses are confined to only three sectors.

FIGURE 2
SCENARIO EMPLOYMENT GROWTH, 2008-2035

Sector	2008 Employment	Scenario 1: Business As Usual		Scenario 2: Higher Tgtd. Growth	
		Absolute Change	Percent Change	Absolute Change	Percent Change
		Agriculture & Natural Resources	367	-32	-8.6%
Construction	397	16	3.9%	16	3.9%
Manufacturing	555	318	57.3%	318	57.3%
Wholesale, Transport., & Utilities	961	-76	-7.9%	-76	-7.9%
Retail, Leisure, & Hospitality	6,109	722	11.8%	727	11.9%
Business & Financial Svcs.	2,515	-106	-4.2%	-103	-4.1%
Educational & Health Svcs.	3,849	1,997	51.9%	1,998	51.9%
Government & Unclassified	1,196	1,351	112.9%	1,351	113.0%
Combined Knowledge-Based	2,300	-525	-22.8%	857	37.2%
<i>Targeted Knowledge-Based</i>	1,427	-38	-2.7%	806	56.5%
<i>Other Prof. Sci., & Tech. Svcs.</i>	873	-487	-55.8%	51	5.8%
Total	18,249	3,665	20.1%	5,057	27.7%

Center for Strategic Economic Research, February 2010

Data Source: CSER estimates and projections based on National Employment Time Series Database and Moody's Economy.com information

Economic Outcomes and Land Demand

With continued business growth, various economic outcomes will be realized in the City of Davis economy. In addition to an increase in jobs, the local economy could see corresponding gains in output (market value of goods produced and services provided) and employee compensation (value of wages and benefits) as well as a boost in state and local tax generation (revenue to support services and infrastructure). Figure 3 on the next page illustrates the economic outcomes associated with the projected employment growth in the two scenarios between 2008 and 2035. If Davis were to experience Scenario 1 employment growth through 2035 (close to 3,700 jobs), the economy would see a corresponding gain of about \$406 million of output, \$183 million of employee compensation, and \$14 million of revenue from state and local taxes (values in 2008 dollars). With a greater level of employment growth concentrated in the high value knowledge-based sectors, Scenario 2 presents notably larger economic outcomes over the projection period (associated with the net gain of nearly 5,100 jobs) at approximately \$586 million of output, \$252 million of compensation, and \$19 million of state and local taxes (values in 2008 dollars).

FIGURE 3
SCENARIO ECONOMIC OUTCOMES
AND LAND DEMAND, 2008-2035
(VALUES IN 2008 DOLLARS)

<i>Outcome</i>	<i>Scenario 1: Business As Usual</i>	<i>Scenario 2: Higher Tgtd. Growth</i>
Jobs	3,665	5,057
Output	\$406,085,172	\$586,194,969
Employee Compensation	\$182,713,845	\$252,251,329
State & Local Tax Generation	\$14,469,465	\$19,475,704
Land Demand Range (Acres)	87.4 - 117.6	118.5 - 159.5

Center for Strategic Economic Research, February 2010
 Data Source: CSER estimates and projections based on National Employment Time Series Database, Moody's Economy.com, IMPLAN 2007 Coefficients, and City of Davis information
 Note: Land demand based on 250 square feet per employee for retail buildings; 325 square feet per employee for office and public buildings; 800 square feet per employee for industrial buildings, and floor area ratios of 0.26 and 0.35.

As the economy grows, establishments will require additional space to house new jobs and produce goods and provide services. Figure 3 above also shows the potential land demand in acres for the three scenarios based on City of Davis Community Development Department staff estimates that incorporated square feet per employee values by building type (e.g. retail, office, and industrial) and varying floor area ratios (amount of land on the site covered by the total building area). The demand for land resulting from the projected employment growth during the 2008 to 2035 period ranges from approximately 87 acres to 160 acres with Scenario 1 toward the low end and Scenario 2 at the high end. These differences not only reflect the projected job growth, but also the mix of types of commercial space and varying levels of development intensity. While not directly part of this project, it is important to consider whether most of this demand could be absorbed in existing space within the current City boundaries or if, after viable existing space is developed and occupied, additional land would be needed to accommodate the growth.

Economic Contributions of a New Business Park

A separate analysis focusing on a specific development opportunity in the City of Davis was extracted directly from the *Business Park Viability Study* prepared by ESG in 2008. This analysis of the potential economic contributions of a new business park uses the employment estimates in the Basic Business Park/No Residential development scenario from the ESG study with a sector employment mix provided by the City of Davis Community Development Department staff. Figure 4 on the next page shows the potential economic outcomes associated with the total jobs potentially supported by the business park at buildout. ESG's Basic Business Park/No Residential development scenario suggests that a new business park of 100 acres (66 net acres) could contain 2,586 jobs at buildout (16 years at the time of the study). The City's Community Development Department staff's assessment shows jobs in five main sectors, heavily weighted toward

the Combined Knowledge-Based sector. If the new business park were inserted directly into the current economy at full buildout potential, irrespective of the growth projections in the broader economy (e.g. employment Scenarios 1 and 2 presented in this report), it could directly generate economic outcomes equaling nearly \$445 million of output, \$138 million of employee compensation, and \$19 million of state and local tax revenue in addition to the roughly 2,600 jobs housed in the park (values in 2008 dollars). It is important to note that the new business park information is a distinct analysis of one specific development at buildout and is not intended to be directly comparable to the other sections of the report covering the employment growth projections.

FIGURE 4
NEW BUSINESS PARK ECONOMIC
OUTCOMES AND LAND DEMAND,
AT BUILDOUT
(VALUES IN 2008 DOLLARS)

<i>Outcome</i>	<i>Value</i>
Jobs	2,586
Agriculture & Natural Resources	0
Construction	0
Manufacturing	328
Wholesale, Transport., & Utilities	0
Retail, Leisure, & Hospitality	258
Business & Financial Svcs.	251
Educational & Health Svcs.	0
Government & Unclassified	388
Combined Knowledge-Based	1,360
<i>Targeted Knowledge-Based</i>	<i>844</i>
<i>Other Prof. Sci., & Tech. Svcs.</i>	<i>516</i>
Output	\$444,842,229
Employee Compensation	\$137,633,678
State & Local Tax Generation	\$18,845,106
Land Demand Range (Acres)	100 (66 net)

Center for Strategic Economic Research, February 2010
 Data Source: CSER estimates based on IMPLAN 2007 Coefficients, ESG, and City of Davis information
 Note: ESG assumptions for the new business park include 2,586 jobs, 862,000 square feet of total building area, 90 percent office/flex and 10 percent ancillary support, 66 net developable acres, 0.30 floor area ratio, and 3 employees per 1,000 square feet

Research Methodology and Sources

Introduction

In order to create an employment time series with industry sector detail for the City of Davis, CSER acquired the sub-set of the National Employment Time Series (NETS) database for Yolo County. The NETS database was developed by Walls & Associates using the Dunn & Bradstreet (D&B) business database for each year from 1990 to the most current update, 2008. D&B records provide specific company level information including establishment employment levels, industry sector classification, and physical location. CSER used a four-step process to create the City of Davis data set. First, all records outside the City of Davis boundaries were removed using city and eight-digit zip code filtering. Second, records were spot checked to ensure that known large companies in the City of Davis were accounted for. CSER discovered that three large companies were not included (Rabbit Semiconductor, Schilling Robotics, and Davis Ace Hardware) and added those records based on information from another business database, ReferenceUSA, and the Sacramento Region Business Journal series of Book of Lists and High Tech Direct profiles. Third, another spot check was performed to identify erroneous records—questionable records were researched further to confirm inclusion. Fourth, records were aggregated by industry sector based on four-digit North American Industry Classification System (NAICS) codes. Many records reflected NAICS codes that changed in various years as a result of D&B information. To create a consistent time series where noise due to invalid classifications was reduced, CSER confirmed the correct industry classification for the largest 20 companies and kept the 2008 classification for the remaining records. These four steps also allowed CSER to remove all University of California, Davis-related establishments from the data set. In the end, a data set with annual four-digit NAICS employment from 1990 to 2008 for the City of Davis was available for analysis. Roughly 2,900 establishments are accounted for in the data set. It is important to note that CSER believes this data set provides a reasonable accounting of the Davis economy, but since no other comprehensive detailed data sets are available for the City and the NETS database is based on D&B-generated business records, the accuracy cannot be fully verified.

Regional four-digit NAICS employment information was obtained from Moody's Economy.com for the Sacramento-Arden Arcade-Roseville Metropolitan Statistical Area (MSA—El Dorado, Placer, Sacramento, and Yolo Counties) and the Vallejo-Fairfield MSA (Solano County). The two MSA databases were aggregated to create the Sacramento region data set for analysis. The Moody's Economy.com data includes annual historical employment from 1970 to 2008 as well as projections for 2009 to 2039. The historical data are created using official government-provided estimates of employment by industry. Moody's Economy.com projections are developed using a proprietary econometric model and are highly-regarded by researchers throughout the country, including CSER.

Value of Local Economic Development

The general discussion of the value of local economic development was developed based on CSER professional knowledge in the fields of economic development and regional economics. This professional knowledge is founded on the work conducted over the 30-year history of the organization, active participation in economic development through the longstanding partnership with the Sacramento Area Commerce and Trade Organization (SACTO), involvement in the International Economic Development Council and California Association for Local Economic Development, and reading of academic textbooks (e.g. *Local Economic Development Analysis and Practice* by Blair and *Understanding Local Economic Development* by Malizia and Feser) and journals (e.g. *Economic Development Quarterly* and *Applied Research in Economic Development*).

The estimates of economic impacts for the knowledge-based sector prototypes were completed using the IMPLAN input-output model, calibrated specifically for the City of Davis using the 2007 data parameters (the most current coefficients available at the time of analysis). This model is widely used for economic and fiscal analysis to quantify the full range of economic impacts including direct, indirect, and induced benefits. Direct benefits consist of economic activity related exclusively within the defined knowledge-based sector prototype. This includes all expenditures made by establishments and all employees who work directly for the establishments. Indirect benefits define the creation of additional economic activity that results from linked firms, suppliers of goods and services, and provision of operating inputs. Induced benefits measure the consumption expenditures of direct and indirect sector employees. Examples of induced benefits include employees' expenditures on items such as retail purchases, housing, medical services, banking, and insurance. By defining the study area boundaries, the City of Davis, the model captures inter-industry and spending relationships only within the defined economy. CSER used the model's regional purchasing coefficients, which account for proportional spending patterns within the study area, to further account for indirect and induced activity leakages outside the City of Davis economy (e.g. suppliers of goods and services located outside the City and shopping trips outside Davis). The knowledge-based prototypes were translated into NAICS (with consideration given to whether the activity has existed in the City's economy in the past) and then to IMPLAN specific codes for model analysis using the standard NAICS-IMPLAN crosswalk (a bridge between unique IMPLAN codes and corresponding NAICS codes)—Scientific Research & Development Services was classified as NAICS 5417; Life Sciences & Medical Device Manufacturing as NAICS 3254; Clean Energy Component Manufacturing as NAICS 3344; Technical Consulting Services as the aggregate of NAICS 5416 and 5419; and Computer System Design Services as NAICS 5415. The model was then used to quantify the impact of 10 jobs for each prototype.

Employment Growth Projections

The employment projections for Scenarios 1 and 2, *Business As Usual* and *Higher Targeted Growth*, used historical NETS and Moody's Economy.com for Davis and the

Sacramento region, respectively, and Moody's Economy.com projections for the region. Analysis was completed at the aggregated two-digit NAICS level except for the sectors related to the five knowledge-based sector prototypes which were removed from the two-digit aggregates and accounted for separately. Scenario 1 uses employment best fit trend line analysis for Davis and the region from 1990 to 2008 ($y = m_1x_1 + m_2x_2 + \dots + b$) and assumes trend relationship between the local and regional economies continues through 2035. Scenario 2 builds on the Scenario 1 estimates for all sectors except the five knowledge-based sector prototypes. For the knowledge-based sector prototypes, Scenario 2 assumes the average proportion of regional employment growth captured in each of the five prototypes at the local level from 1991 to 2008 ($davis08 - davis91 / region08 - region91$) continues through 2035. In addition, for the incremental growth in the five prototypes above Scenario 1, the annual average indirect and induced impacts distributed to all industry sectors was calculated using the IMPLAN model and applied through the projection period based on the assumption that an inter-industry response could occur with growth above the historical employment trend. Furthermore, the City's Community Development Department staff believes that the Professional, Scientific, & Technical Services sector overall represents knowledge-based activities that fit the City's values and identity and are reflected in strategic goals; therefore, for the residual of this sector (after the related prototypes are excluded), Scenario 2 also assumes the average proportion of regional employment growth captured in this local sector from 1991 to 2008 continues through 2035. **It is important to note that both scenarios reflect mathematical calculations based on the stated assumptions about future conditions. The projections are developed simply to provide varying estimates of future employment levels for economic outcome and land demand discussions and are not meant to incorporate judgments about the likelihood of the projection results or embedded assumptions.**

Economic Outcomes and Land Demand

Estimates of economic outcomes associated with the two employment growth projection scenarios were derived using the IMPLAN model parameters. New job projections at the two-digit NAICS and assigned knowledge-based sector codes were applied to IMPLAN model data on output per employee and compensation per employee as well as state and local tax generation related exclusively to the direct economic activity. The output measure accounts for total revenues including all sources of income or the market value of production generated by an industry for a given time period. This is the best overall measure of business and economic activity because it is the measure most firms use to determine current activity levels. Employee Compensation includes wages, salaries, benefits, and all other employer contributions. This measure shows how the employment levels convert to financial and fiscal potential. Tax generation estimates are limited to sources of state and local revenue (federal is excluded). Residents and business benefit from the use of these taxes for both local and broader statewide services and infrastructure (e.g. public safety, schools, parks, and freeways). While it is clear that there are tax impacts resulting from economic growth, this information should only be viewed as a rough estimate of tax generation and not specific allocation. California's recent fiscal restructuring creates a limitation to this analysis since the model is restricted

in accounting for this behavior and determining how much of the tax impact will be allocated to different government sources.

Information for the land demand analysis was generated by the City of Davis Community Development Department staff. CSER provided guidance on likely type of space for certain economic activities (e.g. retail, office, and industrial) as well as possible square foot per employee assumptions based on the models used in the Sacramento Area Council of Government's Sacramento Region Blueprint Land Use and Transportation Study (250 square feet per employee for retail, 325 square feet per employee for office/public, and 800 square feet per employee for industrial). Community Development Department staff provided land demand in acres based on varying floor area ratios (0.26 and 0.35) for Scenarios 1 and 2.

Economic Contributions of a New Business Park

Information for the analysis of the potential economic contributions of a new business park was extracted directly from the 2008 ESG *Business Park Viability Study* under the direction of the City of Davis Community Development Department staff to use the buildout job estimates from the Basic Business Park/No Residential scenario in the report. City staff also provided internally-developed assumptions of the mix of jobs potentially housed in the new business park, based in-part on the City's 2008 economic structure, to allow CSER to break the total job estimate down into specific economic activities. Per City staff, key assumptions embedded in the report scenario for the new business park include 2,586 jobs, 862,000 square feet of total building area, 90 percent office/flex and 10 percent ancillary support, 100 acres of land demand (66 net), 0.30 floor area ratio, and 3 employees per 1,000 square feet. Estimates of economic outcomes associated with the new business park were calculated in a similar way as the employment growth projection scenarios. (A broader economic impact analysis for this scenario was not undertaken since supportable growth values could not be assessed independent of expected behavior in the rest of the economy.) It is important to note that this analysis focuses on employment potential for one specific development at buildout (16 years at the time of the ESG study) and does not necessarily account for the broader City of Davis economy like the other sections of the report. Therefore, the new business park information is not intended to be directly comparable to the other sections of the report covering the employment growth projections.

About CSER

The Center for Strategic Economic Research (CSER) is an economic research and consulting group specializing in applied research and strategy development in the regional economics and economic development fields. The organization has been engaged in economic research activities for over 30 years, originally as a research institute affiliated with California State University, Sacramento, known as the Real Estate and Land Use Institute (RELUI), and later as the Sacramento Regional Research Institute (SRRRI) in conjunction with the Sacramento Area Commerce and Trade Organization

(SACTO). Currently, the organization is structured as an independent research center affiliated with SACTO. CSER provides a wide range of customized economic and demographic research projects through its consulting practice and supports the Sacramento Region's economic development efforts. CSER's extensive knowledge of regional economics and economic development, combined with a rigorous and strategic approach to research, have generated a wide range of experience conducting projects such as market and feasibility analyses; economic and tax impact studies; economic development strategies; industry and workforce studies; and economic and demographic profiles. Through its longstanding relationship with SACTO, CSER produces signature economic reports and acts as the economic research team for the economic development corporation, providing data and analysis for company prospects, local cities and counties, and regional marketing efforts. Businesses, government entities, educational institutions, and non-profit organizations throughout the country have benefitted from CSER's highly-respected research services. CSER focuses on providing its clients with credible and objective research to help them make informed and strategic decisions.